Dental Abstracts

a selection of world dental literature

AMERICAN DENTAL ASSOCIATION

Volume 6 • Number 2
FEBRUARY 1961

VOLUME 6 • NUMBER 2 • FEBRUARY 1961

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Published monthly by the American Dental Association at 1009 Sloan Street, Crawfordsville, Indiana. Entered as second class matter at the Post Office at Crawfordsville, Indiana, under the act of March 26, 1956. Change of address notices, undeliverable copies, orders for subscriptions, and other mail items are to be sent to editorial and executive offices, 222 East Superior Street, Chicago 11, Illinois. Printed in U.S.A. Subscription $8.00 a year in U.S.A.; $9.00 outside U.S.A. Single copy $1.00. Issue of February 1961, Vol. 6, No. 2. Copyright 1961 by the American Dental Association. All expressions of opinion and statements of supposed fact are those of the author of the abstracted article and are not to be regarded as expressing the views of the American Dental Association unless such opinions or statements have been adopted by the Association.

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2. To provide, by a few hours' reading, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and

3. To supply enough data in each abstract and digest that the reader may determine whether he wishes to refer to the original article for more complete information.

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Principles in radiation hygiene and their application to dentistry

Seymour H. Yale, D. D. S., Chicago*

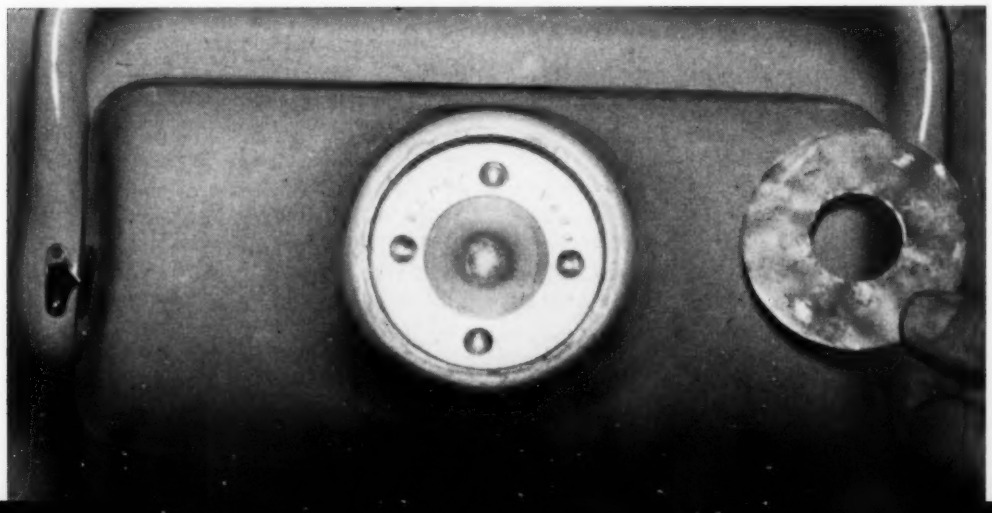
Currently there is a gradual transition from radiation hazard to radiation hygiene in dentistry. Dr. Yale, in this article specially prepared for *Dental Abstracts*, evaluates the current literature pertinent to radiation hazards in dentistry and analyzes the responsibilities of the dentist in maintaining effective radiation hygiene in clinical practice.

With the acceptance of the roentgenogram as an invaluable diagnostic aid by the dental profession and with the patient's growing awareness of the importance of routine x-ray service, dental roentgenography has undeniably become an indispensable part of good dental procedure. During the 1950's the largest number of diagnostic x-ray machines in this country (in excess of 85,000) were being used by the dental profession.

On June 12, 1956, the National Academy of Sciences released its publication, "The Biological Effects of Atomic Radiation—A Report to the Public."[1] The response of the lay press was dramatic. Whereas many well written and informative articles on the radiation problem appeared in newspapers and magazines throughout the country, it seems that two nationally prominent radio and television commentators distorted the facts. Confusion became rampant in the minds of a public who had inadvertently been conditioned to associate synonymously the terms "x-ray" and "dental x-ray." If one were to question the justice of this indictment, he had only to remember that our whole philosophy of diagnosis was directly coupled with the fact that every dentist owning a dental x-ray machine is his own radiologist. The medical profession, having long acknowledged radiology as a specialty, had created quite a different situation. The medical radiologist, in devoting all of his time to his particular specialty, was undoubtedly capable of evaluating the dangers of radiation. But was the dentist, in the part-time practice of this now all important field, equally prepared? This was the question that led many patients to refuse dental x-ray service. This same question became instrumental in fostering a positive program in research, re-evaluation and education within the dental profession that is gradually substituting radiation hygiene for radiation hazard. The methodology and technology for maintenance of good radiation hygiene existed long before the National Academy of Sciences published its report. That such a rationale did not become an integral part of the dentist's training is the fault of an educational system, in many dental schools, that failed to recognize radiology as a separate entity within the dental curriculum.

In recapitulating the events after the publica-

Figure 1 X-ray tube head showing open beam port and collimator



tion of the Academy of Science report, this paper will evaluate the current literature that is pertinent to radiation hazards in dentistry and analyze the responsibilities of the dentist in maintaining effective radiation hygiene in clinical practice.

Biological Response to Radiation

To evaluate intelligently the effects of radiation, one must become conversant with some of its basic principles. All radiation is measured in a physical unit called the roentgen (r). Although the physicist's definition of this unit is somewhat involved from a biological standpoint, the roentgen many be simply defined as a unit dose of tissue-received radiation. In assessing physiological response to radiation, it becomes evident that the degree of tissue reaction is dependent upon the number of roentgens received. The degree of response or radiosensitivity, however, varies from tissue to tissue. Whereas epithelial and blood forming tissues show a pronounced reaction to radiation, connective tissue, muscle and nervous tissue show a lesser response to the same amount of radiation.[2]

Biological response to radiation is also manifested in its genetic and somatic effects. With respect to the genetic effects of radiation, geneticists are in agreement on three basic points: (1) almost all detectable mutations are to some extent harmful; (2) as the incidence and amount of x-radiation increases, the mutation rate increases; and (3) measurable criteria in radiation-induced genetic damage are available for experimental animals, but are almost totally nonexistent in man.[3] It logically follows that in man, the amount of harmful effects created by radiation is proportional to the total dose to the gonads from one's conception through his own reproductive period—a span of about 30 years. In order to implement a quantitative guideline for measurement of gonadal dose, the Genetics Committee of the National Academy of Sciences recommended that the general public be protected from receiving in excess of 10 r of man-made radiation to the reproductive cells during this 30 year period. The committee also indicated that 3 to 4 r of this amount were being used by the medical and dental professions.[1]

In its utilization of radiation for therapy as well as diagnosis, the medical profession requires the majority of this 3 to 4 r level. It can probably be assumed that dentistry should contribute a maximum of 1 r of this dose to the reproductive cells. In order to determine the number of full mouth roentgenographic examinations needed to use up this 1 r reproductive dose, we measured gonadal dose in 24 men incident to complete intraoral roentgenography by placing a special ionization chamber at the gonads. Without any added filtration, an average of 0.005 r to the gonads was recorded at the conventional 65 kvp and 10 ma. using medium speed film. This energy and filtration level and film speed is comparable to that used in most dental offices. The absence of added filtration is, of course, not to be condoned, but, in terms of practical application, this 0.005 r measurement represents the ridiculous total of 200 full mouth examinations during the 0 to 30 year period required to reach the 1 r reproductive cell dose level. Our findings were in agreement with those of Eselman [4] of Pittsburgh and Richards [5] of Michigan.

In analyzing such experimental evidence, it is apparent that genetic damage to the patient during dental roentgenography is probably negligible even when an unfiltered x-ray beam is used. However, employing proper filtration, collimation, increased kilovoltage and using high speed film reduces the danger to an absolute minimum. It is of more than academic interest to note that the gonadal dose measured in a group of 12 year old boys was twice that recorded in the adult series. The striking difference is easily explainable—the child's trunk is shorter than the adult's and consequently the occlusal plane to gonad distance is less.

The effects of radiation upon one's own somatic cells present yet another problem and herein lies the basic rationale for dentistry's concern in reducing radiation to the patient and especially to the operator. There is evidence to indicate that acceleration of the aging process and carcinogenesis are potential sequelae to repeated small doses of radiation received over a long period of time. Most investigators are in agreement that the effect of radiation on the aging process is similar to that of bacterial agents, chemical toxins, and so forth. Radiation has additional disadvantages in that its effects are cumulative and essentially irreversible. The evidence for initiation of radiation induced malignancies is, perhaps, less speculative.

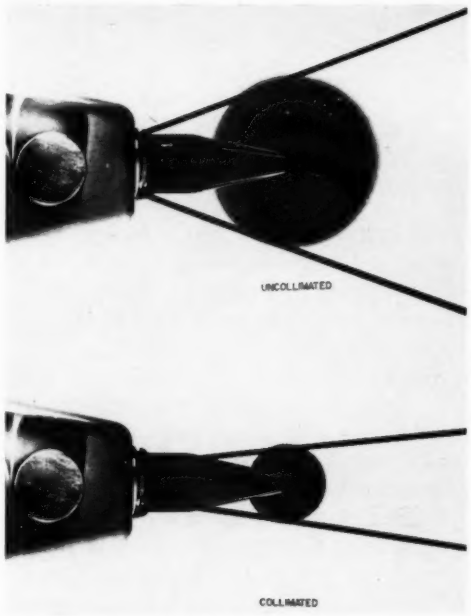


Figure 2 Quantitative radiation reduction through control of x-ray beam diameter (collimation)

Failla [6] of Memorial Hospital in New York feels that radiation induced malignancies occur as a result of mutations in somatic cells. He points out that normal wound healing is brought to its natural culmination by virtue of the so-called antiproliferative agent genetically inherent to each cell. When the gene responsible for this antiproliferative agent undergoes mutation, the agent is no longer produced, the affected cell acquires the potentiality for indefinite division and malignancy results. In a clinical evaluation of radiation induced malignancies, March [7] reported that the incidence of leukemia among medical radiologists is nine times greater than that of other physicians. Although this study is representative of a group of individuals who have been subjected to repeated relatively low doses of radiation over a period of years, it is interesting to note that a similar increase in the incidence of leukemia, on a single large dose basic, occurred in the people of Hiroshima and Nagasaki as a sequel to the bombings. Experiments with rats and mice confirm the scanty human data in that the incidence of leukemia can be increased by either long term, small dose or single, large dose exposure.[8]

The biological response to radiation may also be assessed in terms of "local dose" and "total body dose." Whereas local dose refers to the irradiation of a specific area, the term total body dose indicates that theoretically all body cells have been exposed to radiation. A total body dose in excess of 450 r is also termed the "lethal dose," resulting in acute radiation sickness and death. Such exposure has occurred only as a result of atomic energy accidents and the Japanese bombings. Doses of this nature are, of course, not even remotely within the capacities of a dental x-ray machine. However, dentists, in common with other people working with radiation, are governed by a personal total body dose level called the maximum permissible dose (MPD). The MPD has recently been reduced from 0.3 r per week to 0.1 r per week.[9]

The Addendum to Handbook 59, National Bureau of Standards, qualifies this reduction by stating:

> The changes in the accumulated MPD are not the result of positive evidence of damage due to use of the earlier permissible dose levels, but rather are based on the desire to bring the MPD into accord with the trends of scientific opinion. . . .[10]

In a practical sense, this simply means that those of us who use radiation should utilize the MPD as a guide to personal exposure.

Methods for Reduction of Radiation

The newer dental x-ray machines operating at 90 kvp, 15 ma. and equipped with electronic timers reduce radiation hazards to a minimum. However, inasmuch as the majority of the 85,000 dental x-ray machines currently in use in this country operate at 65 kvp and 10 ma. and use mechanical timers, the major portion of the discussion will be confined to this group.

In a study carried out by the University on 94 x-ray machines operating at 65 kvp and 10 ma., with no added filtration and using medium speed film, an average of 50 r was delivered to the face and jaws during the equivalent of a 20-film full mouth roentgenographic examination. Our experimental data also indicate that the operators of such machines standing three feet from the patient received an average of 0.007 r, or 7 per cent of the maximum permissible weekly dose during this examination. Under these conditions, the dentists

representing this group are limited to the equivalent of 13 20-film full mouth roentgenographic examinations per week. In such circumstances, neither the level of radiation to the patient nor the co-existing maximum permissible dose restrictions of the dentist are consistent with the practice of good radiation hygiene.

Collimation, or limiting the diameter of the x-ray beam (Fig. 1), is the first step toward reducing radiation. Collimation decreases the diameter of the beam much as the tiny hole in the water syringe limits the size of the stream of water directed into the patient's mouth (Fig. 2). The collimator is essentially a lead washer cut to fit snugly into the window of the x-ray machine. The material carries the technical specification of "4 pound" lead and is available in plumbing supply shops. A properly collimated beam will produce a bundle of rays 2½ inches in diameter at cone tip. There is no universal collimator aperture size because of the variation in target (source)-cone distance in the various brands of x-ray machines. We have calculated the collimator aperture size for a number of brands of machines from the data of Richards, and others[11] (see table).

Manufacturers of other brands of dental x-ray machines will supply collimator aperture size data on request. Proper collimation demands a high level of technical skill in roentgenography if "cone-cutting" is to be avoided.

Although collimation of the x-ray beam results in the absorption of substantial amounts of the peripheral radiation, neither quantitative nor qualitative alterations occur in the central portions of the beam. The introduction of a filtering material, such as aluminum, into the path of the collimated x-ray beam not only reduces the amount of radiation, but also alters its qualitative characteristics (Fig. 3). This added filtration should not be confused with the inherent filtration implemented by the glass envelope and the air or oil coolant surrounding the x-ray tube. The term "total filtration" describes the sum of inherent and added filtration.

The Committee on X-ray Protection of the American Academy of Oral Roentgenology recommends total filtration of the equivalent of 2 mm. of aluminum for dental x-ray machines.[11] This level is mandatory in New York State and is gradually being adopted by other states.[12-14] (The enforcement of a law requiring registration of x-ray machines in the State of Illinois[15] will, in all probability, be followed by legislation for similar filtration standards.)

Table *Collimator aperture size for dental x-ray machines*

Brand of machine	Model no.	Aperture size (inches)
G. E.	E	1 1/4
G. E.	70 and 90	7/10
Ritter	B and D	1 1/4
Ritter	E	1 1/2
Weber		7/10
XRM		9/10

The concurrent marketing of high speed dental x-ray film and 90 kvp dental x-ray machines provided a method for pronounced radiation reduction. At the University, we found that when the electronically timed 90 kvp machine and high speed film were used, exposures were reduced to one twentieth of a second per film. Consequently we were able to make a 20-film full mouth examination resulting in a total of only 2 to 3 r exposure to the patient's face. In contrast, in the aforementioned study carried out by the University patients received an average facial dose of as much as 50 r in many dental offices.

Although such a reduction in radiation was both desirable and commendable, its significance was of only academic interest to the majority of dentists who do not own 90 kvp equipment. We immediately directed our efforts toward the development of a method for alteration of the conventional 65 kvp, 10 ma. x-ray machine to permit a more general use of high speed film and approach a comparable reduction in radiation. A 65 kvp, 10 ma. dental x-ray machine, with an inherent filtration of 0.5 mm. aluminum equivalent, was used in the study. The resulting development of the copper-aluminum filtration method for radiation reduction was predicated on the knowledge that high speed dental x-ray film has a range of exposure with an upper limit of about 0.6 r. This indicates that a 0.6 r exposure blackens the film to a point where almost no light passes through it. In using 0.375 mm. of copper and 0.5 mm. of aluminum as added filtration to reach a range below the "blackening" level of the film, the face dose to the patient was reduced to 5 r per 20-film full mouth x-ray examination.[16]

Copper-aluminum filtration of the 65 kvp ma-

chines acts to harden the beam, allowing only its higher energy quanta to expose the film (Fig. 4). This beam of high average energy quanta produces a roentgenogram of long gray scale contrast comparing favorably to roentgenograms made with a 90 kvp source. However, these dual advantages of radiation reduction and improved diagnostic detail demand a more strict discipline in the over-all roentgenographic procedure as the following step-by-step description of the copper-aluminum filtration method indicates:

1. Collimation of the beam.
2. Addition of 0.375 mm. of copper in increments of three 0.125 mm. wafers followed by 0.5 mm. of aluminum. (The filtering materials are designated as 0.005 inch commercially pure plating copper, and 1100 or 2 S aluminum.)
3. High speed dental film.
4. Exposure time must be determined for individual brands of machines. (2 second exposure was used with the test Weber machine.)
5. Process:
   a. in high contrast developer,
   b. at 68 °F. for 5 minutes,
   c. in complete darkness.
6. Wash, fix and dry films according to usual recommendations.

When viewing roentgenograms made by either the 65 kvp copper-aluminum or the 90 kvp technics, illuminators of a minimum intensity of 500 foot candles are mandatory. The recommendation for this intensity level is based upon an analysis of the efficiency of illuminators in use in the College of Dentistry, University of Illinois.

With the addition of 1.5 mm. aluminum filtration to the 0.5 mm. aluminum equivalent inherent filtration in the 65 kvp machine used in our study (in lieu of copper-aluminum filtration) patients received a facial dose of approximately 25 r during a 20-film full mouth roentgenographic examination.

Survey of Radiation in Dental Offices

During the period extending from November of 1957 to March of 1958, a radiation survey was made of 122 x-ray machines in 113 dental offices in the Chicago area.[17] Based upon experience gained in this earlier pilot radiation survey, the department of radiology at the College of Dentistry, University of Illinois, was awarded a United States Public Health Service Grant to assist in coordinating a large scale radiation survey program. The specific aim of the program was to conduct a survey of the x-ray facilities in 2,000 dental offices under actual operating conditions. Participating grants were awarded to each of ten dental schools in the United States. In order to implement a significant geographic analysis of the data collected, the following dental schools were chosen:

Baylor University	Dallas, Texas
Detroit University	Detroit
Emory University	Atlanta, Ga.
Indiana University	Indianapolis
Temple University	Philadelphia
Tufts University	Boston
University of Kansas City	Kansas City, Mo.
University of Minnesota	Minneapolis
University of Southern California	Los Angeles
University of Washington	Seattle

Each of the ten schools was charged with the collection of specific radiation data on 200 local dental offices.

Results of the afore-mentioned Chicago survey showed that 22.6 per cent of the 122 x-ray machines were collimated and 16.8 per cent were filtered. In the ten school survey of 2,000 dental offices, initial assessment of the data provided by 1,904 x-ray machines indicates that 68.9 per cent of these machines are collimated and 55.5 per

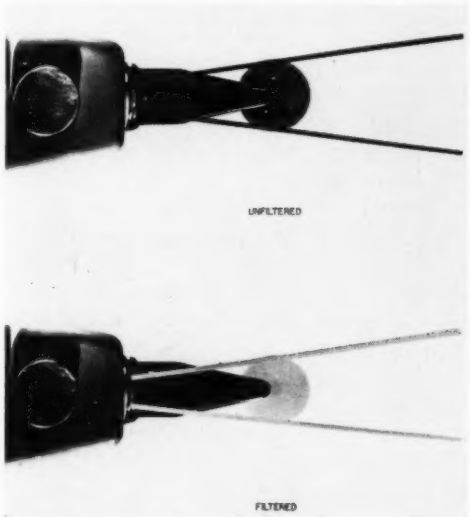


Figure 3 Qualitative (and quantitative) radiation reduction through filtration and collimation

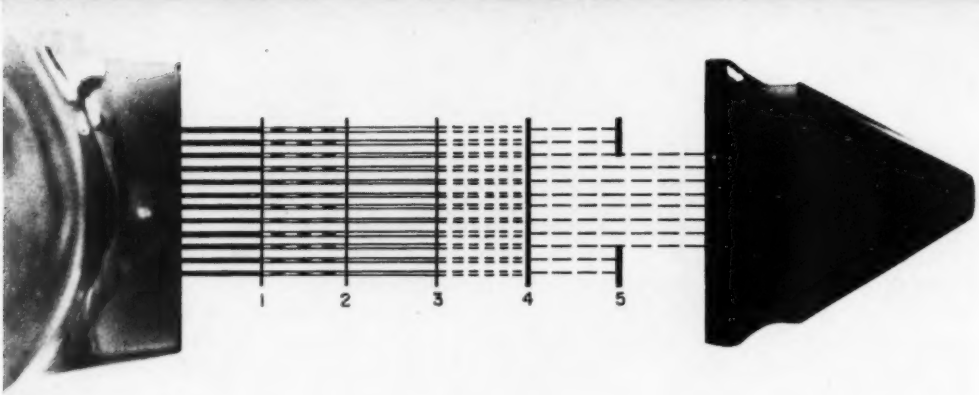


Figure 4 Exploded photo-diagram demonstrating radiation reduction with copper-aluminum filtration and collimation. Decreased density of horizontal lines represents decrease in radiation. 1 = 0.125 mm. copper; 2 = 0.125 mm. copper; 3 = 0.125 mm. copper; 4 = 0.5 mm. aluminum; 5 = 3.0 mm. lead (collimator)

cent are filtered.[18] A second Chicago survey, recently completed, shows collimation and filtration data that compare favorably with the national average. In the evaluation of such data, one may conclude that the widespread research and educational programs in radiation hygiene in dentistry are increasingly effective.

Summary

Cognizant of its total responsibilities in the utilization of x-radiation in oral diagnosis, dentistry has established a two-front attack focused upon the reduction of radiation hazards. These areas are (1) intensive research and (2) continuous professional education.

The gradual transition from radiation hazard to radiation hygiene reflects the positive response of the dental profession to the radiation problem. The recognition that the dentist is more prone to suffer the ill effects of radiation than the patient is should provide sufficient added motivation to complete this transition.

Extensive research in radiation hazards has materially aided the American Dental Association [19] in stating editorially that methods now exist to insure safe standards for dental roentgenography. This concept has been expressed again and again by numerous local dental societies,[20, 21] who have implemented collimation and filtration programs for their members. A universal acceptance of such recommendations by all practicing dentists will help write the final paragraphs in one of dental history's most controversial chapters.

* Professor and head of the department of radiology, College of Dentistry, University of Illinois.

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Fractures

The tolerance of the temporomandibular joint to fracture, dislocation, and associated injury

N. John Wilde. *Plast.& Reconstr.Surg.* 25:574-583 June 1960

The aim of treatment of fractures of the temporomandibular joint is restoration of occlusion, mastication and excursion and for appearance. The principles of treatment which will accomplish these ends with the fewest complications in the most instances are those to be followed. Treatment may be by either open or closed reduction. The author favors closed reduction.

Some authors have asserted that closed reduction leads to the following complications: ankylosis, traumatic arthritis, limited excursion, malocclusion and pain. A review of more than 300 case reports of closed reduction of temporomandibular joint fractures does not bear out such assertions.

One advantage open reduction may offer is the possibility of anatomical reduction, yet this rarely occurs. Among the disadvantages of open reduction are that it causes more fibrosis and scarring, it increases the possibilities of infection and of damage to the facial nerve, and anatomical reduction of such fractures is not necessary to attain the aims of treatment.

The tolerance of the temporomandibular joint to fracture, dislocation and associated injury is extremely great.

If the mandible can be placed easily into occlusion and moved without force through a normal range of motion, the author carries out a closed reduction. Arch bars are placed on both jaws and the teeth are wired into normal occlusion. Intermaxillary wiring is maintained for from five to six weeks. If the number of teeth is inadequate for this procedure, methods are used to establish an occlusal plane.

If the mandible cannot be brought into occlusion easily, or if it cannot be moved without force through a relatively normal range of motion, then closed manipulation is indicated. With the patient under general anesthesia, the angles of the mandible are depressed downward as far as possible, causing traction on the site of the fracture. This traction on the investing soft tissues sometimes will pull the fragments into adequate position so that the mandible can be put into normal occlusion and moved through a normal range of motion. In other instances, a combination of traction and digital manipulation inside and outside the mouth will be successful. Open reduction is the last resort. The author has had to resort to open reduction in only 1 of 48 patients with fracture of the temporomandibular joint. In this one instance, it was necessary only to manipulate the condyle into its fossa.

Ten case reports illustrate closed reduction and the tolerance of the temporomandibular joint to injury. If the jaw is held in proper occlusion while healing takes place, normal occlusion and adequate mandibular excursion almost always will result.

2934 North Fresno Street, Fresno, Calif.

Surgical treatment of mandibular fractures

V. Jovčev. *Stomat.,Sofia* 5:43-54 May 1960

Sixteen patients with 22 simple or multiple fractures of the lower jaw were treated by means of osteosynthesis at the Stomatological Clinic of the University of Sofia, Bulgaria.

The surgical stabilization of the fragments was achieved by using mental rings and plates, osteorrhaphy, and insertion of Kirschner wire through the adjacent soft tissues and the fractured bone (the wire was tightened by a clamp).

The results obtained demonstrated that surgical repair of even complicated mandibular fractures requires only one intervention. In no instance was additional reduction of the bone or fixation of the fragments by orthopedic appliances necessary. Even fractures in the region of the ascending ramus, which usually are difficult to treat, consolidated rapidly and easily.

Masticatory function was restored more quickly by osteosynthesis than by the previously used orthopedic procedures.

Rue "7 November" 1, Sofia, Bulgaria

Insults to the supporting structures of the teeth with advancing age

W. J. Greek. *J.Tennessee* D.A. 40:176-182 July 1960

Changes with age in the adult alveolar bone result largely or entirely from pathologic processes (of periodontal disease) and little, if any, from physiologic influences.

Microscopic examination of teeth by the technic suggested by C. C. Bass (1946) indicates the presence of some destructive process occurring around almost every tooth. The amount of destruction varies in every mouth and in different degrees around individual teeth. This would suggest that local influences are causing this apical proliferation of the epithelial attachment with subsequent bone resorption. If this were a generalized process as a direct result of aging, one would expect to see a relatively equal amount of destruction of alveolar bone and periodontal membrane around all of the teeth. Also, one would expect a similar amount of bone loss at different locations around any one tooth. This is not so.

Periodontal diseases exist in varying degrees of severity in almost every mouth from the eruption of the first tooth until the individual is edentulous. Although periodontal disease is present in some form almost continuously, it may never manifest itself as a clinical entity.

A major question is whether inflammation is a measure of physiologic activity or a response to pathologic processes. The suggested approach to resolving this controversy is in the design of studies which would determine the sources of inflammation in the periodontium. Among the questions that need to be answered in order to resolve this controversy are the following:

1. If a person can maintain his mouth free from filamentous microorganisms and calculus, will inflammation still be observed microscopically?

2. If the periodontium remains free from inflammation, will gingival recession and alveolar bone resorption still occur?

3. Can the microorganisms normally present in the mouth be replaced with innocuous organisms which will not cause periodontal disease?

4. What do those persons who have reached advanced age and are more or less free from periodontal disease have in common?

Washington County Health Department, Jonesboro, Tenn.

The epithelial attachment

Max M. Weinreb. *J.Periodont.* 31:186-196 July 1960

For a long time, the relation of gingival epithelium to the enamel was considered one of close approximation only. This concept, based on G. V. Black's clinical observations, was superseded by Gottlieb's discovery in 1921 of the epithelial attachment. Based on microscopic evidence, Gottlieb found an organic connection between enamel surface and gingival epithelium. Thus, only a shallow crevice exists near the free border of the gingiva.

Waerhaug has recently challenged this concept, asserting that there is no epithelial attachment, "the bottom of the clinical pocket is situated at the deepest line of epithelial attachment, thus the 'epithelial attachment' belongs to the lining of the pocket." Orban and others repeated some of Waerhaug's experiments and refuted his findings.

Recently developed methods of obtaining stained ground sections of soft and hard tissues permit re-examination of this question.

Fifteen monkeys and two cats served as experimental animals. Four different types of experiments were conducted.

1. The gingival pockets around some teeth were filled, either with self-curing acrylic resin or with Cavit, a temporary filling material.

2. Fine steel blades were inserted into the gingival sulcus until the blades met with resistance.

3. Plastic strips resembling the steel blades also were introduced into the gingival crevice and

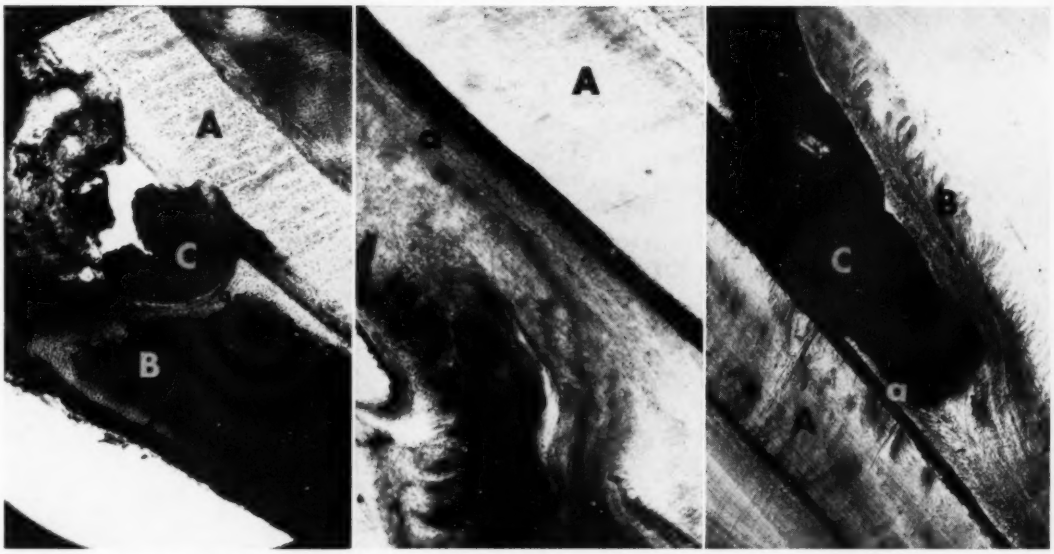

Figure 1 (Left) Photomicrograph of incisor of monkey. A = enamel. B = gingiva. C = acrylic resin introduced into sulcus. a = epithelial lining of pocket and epithelial attachment. Figure 2 (Center) Photomicrograph of incisor of monkey. A = enamel. B = gingiva. a = epithelial attachment in close union with enamel. Figure 3 (Right) Photomicrograph of incisor of monkey. A metal strip has been introduced into the sulcus. A = enamel. B = gingiva. C = metal strip. a = epithelial attachment

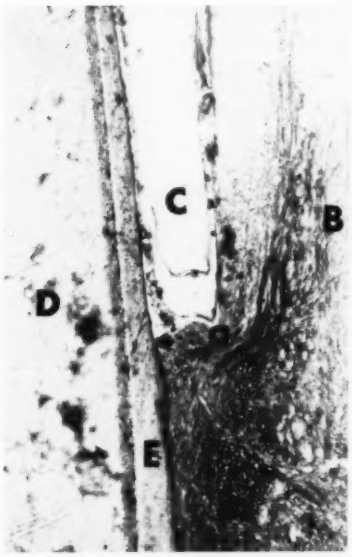

Figure 4 Photomicrograph of ground section of monkey molar. A plastic strip has been placed in the sulcus. D = dentin. B = gingiva. C = plastic strip. E = cementum. a = epithelial attachment

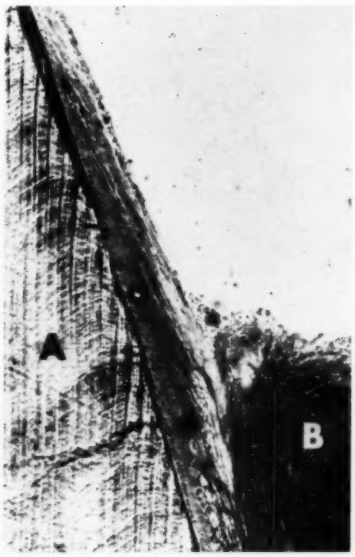

Figure 5 Photomicrograph of ground section of incisor of monkey. A gingival flap was raised and sutured in a reflected position. A = enamel. B = gingiva. a = epithelial attachment

fixed with self-curing acrylic resin.

4. Gingival flaps were made in accordance with Waerhaug's suggestions.

Specimens were prepared according to the method described by the author and M. Tagger.

Filling of the gingival pocket with either Cavit or acrylic resin served to demonstrate the continued adherence of the epithelial cells to the hard tooth substance. There was no break in the continuity of the epithelium and it continued from the oral epithelium under the material in the pocket to its firm and undisturbed union with the enamel (Fig. 1). From this point the enamel epithelium could be followed apically to the cementoenamel junction, always in close and intimate union with the enamel (Fig. 2). In no instance did the resin or Cavit introduced under pressure arrive anywhere near the cementoenamel junction.

The introduction of thin strips of metal or plastic into the gingival sulcus did not detach the epithelial attachment from its union with the hard tooth surface (Fig. 3, 4).

It was equally impossible to detach the gingiva from the hard tooth surface by flaps without causing tears in the epithelium, part of which continued to adhere to the tooth (Fig. 5).

It can be concluded that there is a union between the gingival epithelium and the hard tooth surface.

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The gingival condition of congenitally cyanotic individuals

M. S. F. Gould and D. C. A. Picton. *Brit.D.J.* 109:96-100 Aug. 2, 1960

In view of the number of children who now undergo surgery for congenital heart disease, it was thought of interest to examine the gingival condition of a group of such patients for comparison with a control group in an attempt to find factors responsible for any dental abnormalities. Observations on 30 patients with congenital heart disease and persistent cyanosis were made for gingival condition, calculus, oral hygiene, lip seal, occlusal relationship, clubbing of the fingers, exercise restriction and hemoglobin level. The control group of 30 patients included 13 with congenital heart lesions but no cyanosis at rest.

Many of the cyanotic patients showed some gingival abnormality compared with the control patients, but in only two cyanotic patients was gingival recession readily detectable. The color of the gingivae corresponds fairly closely to the general degree of cyanosis. Patients permanently cyanotic had a lower level of oral hygiene and lip seal, and a higher incidence and greater depth of gingival pocket formation. Gingival recession was pronounced only in the older patients, an observation which contrasts sharply with that of Sallay (1956).

The normal gingival condition found in control patients with congenital heart lesions but no cyanosis supports the observations of others that the relief of constant cyanosis favors a return of the gingivae to a normal condition. The permanently cyanotic patients had a greater degree of digital clubbing, and a hemoglobin level generally at or above 100 per cent.

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An analysis of periodontal disease as a cause of tooth loss

Fali S. Mehta, M. K. Sanjana, B. C. Shroff and R. H. Doctor. *J.All India D.A.* 32:71-76 April 1960

In 1958 the authors published a paper on the relative occurrence and importance of various causes of tooth loss, in which it was observed that periodontal disease is the most prevelant cause of such loss. In the current study, the loss of teeth due to periodontal disease alone is examined in detail.

The material consisted of 1,860 persons with periodontal disease from whom 17,503 teeth were extracted. All patients were more than 16 years old; it appears that periodontal disease severe enough to cause tooth loss occurs only in adults. Of the 1,860 patients, 1,418 were men and 442 were women. The number of extractions per subject was 9.9 teeth for women and 9.3 teeth for men.

The prevalence and intensity of loss of teeth due to periodontal disease increase with age rapidly from 30 years onward, and remain almost

steady up to 50 years of age. The prevalence decreases rapidly thereafter, but not the intensity as measured by the average number of teeth lost per patient.

The teeth affected most frequently by periodontal disease, based on the number of extractions, are the cuspids (2,845), followed in order by the lateral incisors (2,592), second bicuspids (2,580), first bicuspids (2,531), central incisors (2,462), second molars (2,286) and first molars (2,207).

Of the 17,503 teeth extracted, 8,815 were from the right side of upper and lower jaws and 8,688 were from the left side.

All India Dental Association, Bombay 26, India

Prevalence of periodontal disease in a hospitalized population

Henry C. Sandler and S. Sigmund Stahl. *J.D.Res.* 39:439-449 May-June 1960

To measure the prevalence of periodontal disease in a hospitalized population, and to determine whether persons with confirmed diagnoses of specific diseases demonstrate a higher incidence of periodontal disease than those in relatively good health, complete physical and oral examinations were provided for 4,832 hospitalized white male veterans. Of this number, 838 subjects were edentulous, and 3,994 had one or more teeth present in their mouth and, therefore, were potentially susceptible to periodontal disease. Of the 3,994 subjects with teeth, the number of remaining teeth declined rapidly as the age of the subjects increased, from an average of 26.9 teeth per person at ages 20 to 29 years, to 8.8 teeth per person at ages 60 to 69 years.

Periodontal disease affected the supporting structures around 8 per cent of the teeth in subjects up to age 25 years. Thereafter, periodontal disease of the supporting structures increased rapidly at a steady rate of 1.8 per cent of remaining teeth per year until the age of 55 years. By age 45 years, the supporting structures of half of all remaining teeth were affected, and at age 55 years, the supporting structures of more than 70 per cent of the teeth were affected. Subjects up to age 55 years whose periodontal tissues had resisted disease tended to maintain this resistance as their age increased.

The influence of systemic diseases on periodontal health was not remarkable except in patients with relatively severe diabetes and in those with cirrhosis of the liver. The incidence of periodontal disease also was higher, but not significantly so, in patients with arteriosclerosis and gastrointestinal disorders.

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Oral surgery

Alloplastic materials in the creation of facial contour

Benito B. Rish. *Arch.Otolaryng.* 72:212-218 Aug. 1960

Patients requiring correction of both chin and nose deformities should undergo both operations concomitantly. Micrognathic or prognathic jaws may occur with or without malocclusion. If malocclusion is present, orthodontic treatment instituted before puberty can be of help. However, if the patient is seen in adult life and an appreciable degree of malocclusion is present, osteotomy or condylectomy becomes essential.

Among substances which have been used to build out the contour of the chin are ivory, gold, silver and platinum (all discarded because of heaviness, tissue reaction and the inability of tissue to tolerate them completely); fresh rib cartilage from the patient; autogenous cancellous iliac bone grafts; and alloplastic materials such as nylon, Dacron, polyethylene, poly(methyl methacrylate), and Teflon.

Nine years ago the author began experimenting with alloplastic materials, at which time six acrylic implants were buried to correct receding chins. After four years the results were evaluated and were uniformly good. Since that time the author has used acrylic implants exclusively, and has inserted 76 acrylic chin implants without a single instance of subsequent extrusion. No infection has occurred. Three cavities have been opened—twice because the implant shifted and had to be moved back into position, and once because the parents of a 14 year old girl wanted a still larger chin implant. The linings of the cavities containing the implants revealed a normal, glistening, cystic type of tissue. Histologic studies demonstrated the minimal reaction encountered.

The proper preparation of the implant is of paramount importance. The material must be of the purest quality. Care must be taken in the preparation of the implant to avoid air bubbles and impurities. The material must be cured for at least 24 hours rather than for the customary three hours as in dental work. The implant then is shaped on a grinding wheel to the exact size and design and polished to a high luster.

Either an intraoral or external approach may be used to insert the implant. The author uses the external approach, making a 2 cm. incision with a no. 15 Bard-Parker blade at the first chin line zone until the bone is contacted (Fig. 1). With a small periosteal elevator the periosteum is lifted from the bone and a small tight pocket of the desired size is made. The subperiosteal dissection should not be carried too far cephalad for fear of obliterating the normal labiomental sulcus. The pocket should not be made any larger than the implant. The implant is inserted in contact with the bone. All bleeding must be controlled. Two or three no. 00 chromic catgut sutures are used for approximation of periosteum to available tissues; no. 00000 silk sutures are used to close the skin. A pressure bandage with elastic adhesive is used and left in place for about six days, after which time both the nasal "mask" and the chin dressing are removed, together with the sutures. In the first postoperative week the patient should remain on a soft or liquid diet. After removal of the bandages no further dressing need be applied.

This procedure offers no appreciable discomfort to the patient and is done concomitantly with the rhinoplasty. It does not prolong hospitalization and offers the most gratifying results both to the patient and the surgeon (Fig. 2).

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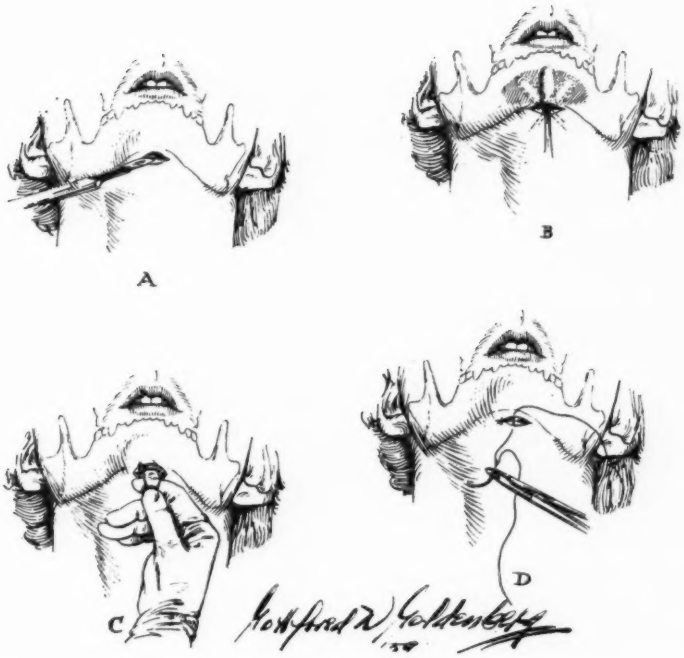
Figure 1 (*Above, right*) *A = incision made with a no. 15 blade on the chin and carried through the periosteum. B = elevating of the periosteum to create a pocket for the implant. C = insertion of the implant into the pocket. D = closure of the incision with no. 00000 silk*

Figure 2 (*Below, right*) *Preoperative and postoperative contours. The insert at the upper left represents the chin implant* (A) *in situ anterior to the lower portion of the mandible*


A
B
C
D

A
A

Prosthetic dentistry

Occlusal patterns in complete dentures

W. D. Pearson. *J.dent.Belge* 51:373-382 May-June 1960 [in English]

What determines the selection of the occlusal pattern that dentists describe? Facts, fads, fancy, habit and indifference. Do they learn the facts that are available? Will the articulator selected receive the mounting of the maxillary and mandibular casts in a relation that will permit the occlusal pattern chosen to be constructed on the articulator and returned to the mouth of the patient without alteration?

The natural occlusal pattern is a part of the jaw structure. The occlusal pattern of a complete denture must fulfill the same requirements and should compensate for the handicap under which it must function. Because virtually all the disturbing factors experienced in the use of complete dentures are the result of movement, dentists must understand the mandibular movements if they are to eliminate the cause of disturbing factors.

Occlusion may be discussed from two viewpoints: (1) the static relations occurring by various possible contacts of the teeth without the interposing of food, and (2) the dynamic relations occurring during mastication. The occlusal pattern of a complete denture must be so constructed that both the static and dynamic relations can occur without causing functional interference of other occlusal components such as (1) the temporomandibular joint; (2) the oral and facial musculature; (3) the tissue support for the denture bases, and (4) the teeth.

The main problem of occlusion in prosthodontics consists in establishing the proper relation between each occlusal component to the other components in varying situations.

The advantages of using a reverse occlusal curve to achieve a lateral balance in the region of the last molars are as follows: (1) a mechanical stability of lower dentures; (2) a free lateral escapement for food before, during and after mastication, and (3) an unrestricted lateral jaw movement.

The disadvantages are as follows: (1) an inadequate lateral balance; (2) excessive chairtime for insertion; (3) a medium adjustment rate requiring excessive chairtime; (4) a denture base movement which causes occlusal interference; (5) an excessive relief required in the mylohyoid ridge area, and (6) a moderate or higher ridge resorption.

The advantages of using a flat occlusal plane are as follows: (1) freedom from cuspal interference; (2) unrestricted lateral jaw movements; (3) minimum occlusal interference from lateral movements of the denture base; (4) moderate chairtime for insertion, and (5) moderate adjustment rate.

The disadvantages are as follows: (1) unnatural appearance; (2) inadequate balancing contacts causing disturbances in lateral jaw movements; (3) unfavorable pressure on both the upper and the lower denture bases exerted by posterior balancing; (4) excessive vertical occlusal forces applied to the anterior part of the basal denture site during protrusive movements, and (5) moderate ridge resorption.

The advantages of anatomic tooth form arranged on a normal compensating curve are as follows: (1) most efficient mechanical function and form; (2) minimum chairtime required for insertion; (3) base stability provided by multiple incline planes, and (4) moderate adjustment rate.

The disadvantages are as follows: (1) restricted mandibular movements; (2) cusp interference during jaw movements and denture base movements; (3) high ridge resorption, and (4) inadequate tissue compensation for all occlusal interferences.

The advantages of anatomic tooth forms modified to the patient's individual requirements (1.5 mm. added to the width of the geometric line recorded on the tracing table as free space between the inclination of the cusps) are as follows: (1) efficient mechanical form; (2) improved esthetics; (3) freedom of lateral movements; (4) open spillways; (5) base stability provided by multiple incline planes; (6) freedom from tooth clogging; (7) minimum chairtime required for insertion; (8)

low adjustment rate, and (9) minimum ridge loss.

This anatomic tooth form has proved the choice of occlusal pattern in the greatest number of patients requiring prosthodontic service.

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Flap operation with mucobuccal fold extension of a periodontally involved abutment tooth: report of case

Anna Boudin. *J.dent.Belge* 51:393-396 May-June 1960 [in English]

In the case reported, the trouble originated in the upper right cuspid which carried a gold and acrylic veneer crown and served as end abutment of a six-tooth anterior splint bridge that had been inserted ten years previously. The crown contained a precision attachment to support the removable partial denture.

The symptoms were acute and consisted of considerable soreness, redness and swelling in the apex region, a deep distal gingival pocket and a persistent oozing of pus. The cuspid was sore to touch and pressure of occlusion. The roentgenogram revealed extensive destruction of periodontal tissue extending to the apex. Subgingival conservative curettage did not produce improvement.

The main problem was whether this condition could be resolved by a flap operation without disturbing the fixed bridge and the precision attachment, thereby avoiding an entirely new, prolonged and arduous reconstruction project which would obviously require removal of the bridge and extraction of the cuspid. Fortunately, it was decided to perform this operation.

Preoperatively, the pulp chamber was opened through the veneer crown. The pulp chamber was putrescent. After proper treatment, the root canal was filled.

A modified flap operation was performed by an oral surgeon together with frenectomy and creation of a mucobuccal fold extension. By careful subgingival curettage all calculary deposits were removed together with granulomatous tissue.

A Ward's pack was placed in position to assure maintenance of the newly created vestibule as well as to protect the site of operation. After one week, the pack was removed and the area thoroughly cleansed. Another pack then was placed in position.

At the last postoperative visit, it was established that uneventful healing had taken place. The prognosis, therefore, was favorable.

After complete recovery had taken place it was decided to rehabilitate the entire mouth—at least temporarily—because time did not permit the construction of new complete attachments and replacement before the patient left for Europe.

During the ten years in which the fixed and the removable bridge had been worn, the occlusal relationship had been seriously impaired. There was considerable stress on the anterior teeth which doubtless had contributed to the periodontal condition in the upper right cuspid region. In addition to the abnormal occlusion, there was the factor of esthetics. The anterior teeth were far too short and there existed a considerable loss in vertical dimension.

The bite was opened about 2 cm. by replacing all posterior teeth of both bridges with new teeth; thereby establishing a correct occlusal plane.

Thereafter, the upper bridge was carefully removed without disturbing the precision attachment. During this procedure it was discovered that the left cuspid had almost disintegrated. This fact could not be revealed by roentgenographic examination because the defect was hidden completely by the veneer crown. However, the tooth was still vital but the pulp was exposed. No pain was then, or ever had been, felt in this area. The pulp was extirpated, the root canal filled and a gold post and cast jacket crown stump inserted.

The incisal edge of the anterior teeth was lengthened. All acrylic restorations on the labial surfaces were removed and replaced. The same bridge then was recemented. The relationship of the precision attachments and the bridges still remained intact and functioned perfectly. The abutment tooth again appeared to be firm and healthy.

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Operative dentistry

Comparative clinical investigation of dental amalgams containing different silver alloys

C. H. Fischer, L. Mertensmeier and K. Mordass.
Deut.zahnärztl.Zschr. 15:939-946 June 15, 1960

The results of stress and strain exerted on silver amalgam restorations which had been placed in the teeth of five patients at least 30 months previously were studied at the Dental Clinic of the University of The Saarland, Germany. Dental amalgams containing 50, 67 or 70 per cent silver alloys were investigated and the results compared.

There were significant differences observed, especially in regard to structural changes. However, most of these changes could have been produced by the different filling technics (manual or "Vibrator" condensation) used. The cavities, however, had been almost identically prepared.

This fact influenced the investigators to extend the study by placing new silver amalgam restorations in the teeth of ten additional patients. Only 67 and 70 per cent silver alloy amalgams were used and a uniform condensation method applied. Follow-up examinations were made over a period of from one to three years. The setting of the amalgam and the resulting structural changes were studied microscopically. A specially constructed Zeiss microscope was used (Fig. 1). The apparatus had an attachment which made the taking of greatly magnified films under electronic flash bulb lights possible.

A significant convexity of the border of the fillings was observable almost immediately after placing the restoration. After two months, the border region showed extreme bubble formation, clearly visible in micrographs enlarged up to 40 times. The carefully polished surfaces, however, had kept their silvery luster.

The initial corrosion of an amalgam filling containing a 50 per cent silver alloy could be observed one year after insertion (Fig. 2). The

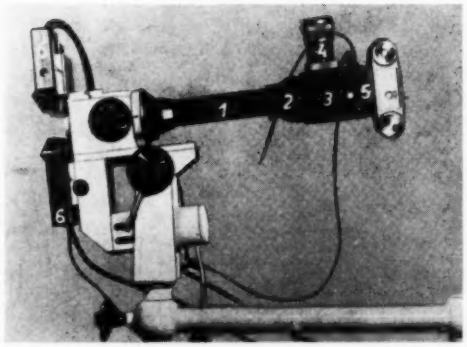

Figure 1 Specially constructed Zeiss microscope with an attachment to take greatly magnified films under electronic flash bulb light. 1 = photographic tube. 2 = connecting tube. 3 = lenses. 4 = target sight with dotted cross. 5 = adapter and camera. 6 = electronic flash light apparatus

deformation in the border region appeared to be greater than in another amalgam filling in which a 67 per cent silver alloy had been used (Fig. 3).

In the amalgam fillings containing a higher percentage of silver, the edges appeared as an acute-angle but the corrosion had involved only comparatively small areas (Fig. 4 and 5).

The mechanical effects of an antagonistic stress, probably caused by masticatory function, seemed to have produced no significant changes either on the polished surfaces or in the border regions. The expected "flow" within the metallic structure did not occur (Fig. 6).

In the amalgam fillings containing a 50 per cent silver alloy no signs were observed which could be interpreted as having been caused by extreme brittleness. These amalgam fillings had

Figure 2 Initial corrosion in the border region of an amalgam restoration containing a 50 per cent silver alloy. Twelve months after placing

Figure 3 Corrosion in an amalgam restoration containing a 50 per cent silver alloy. Twenty-eight months after placing

Figure 4 Bubble formation on the polished surfaces of an amalgam restoration containing a 67 per cent silver alloy. Twenty-nine months after placing

Figure 5 Greater magnification of a segment of the border region of the amalgam restoration in Figure 4

Figure 6 Absence of "flow" in an amalgam restoration containing a 67 per cent silver alloy. Fifteen months after placing

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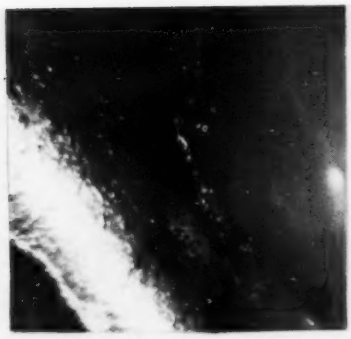

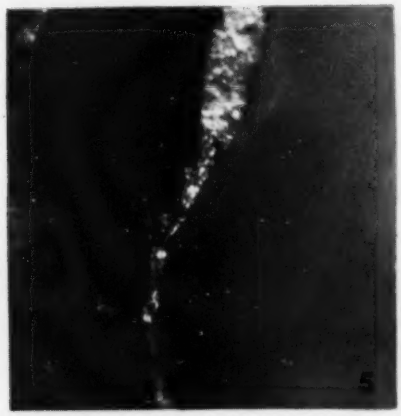
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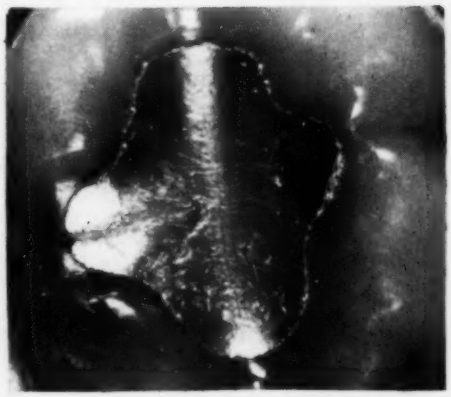

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shown negative expansion tendencies in laboratory tests but, clinically, no signs of an unfavorable stress-strain relationship were determinable.

Based on these purely clinical observations, it was assumed that the macroscopic and microscopic changes, occurring mainly in the border regions of silver amalgam fillings, were limited to the areas of structural continuity or of distinct demarcation. These structural changes seemed to occur independently from the type of silver alloy used. Low contents of silver, however, seemed to produce a more intensive corrosion than did higher contents of silver.

Although many interesting observations were made in this study, no comprehensive conclusion could be drawn in regard to the most favorable mercury content, amalgamation time, crushing strength or dimensional changes of silver amalgam restorations.

Further research with a far greater number of inserted silver amalgam restorations is necessary before any change in the specifications and a final evaluation of previously placed silver amalgam restorations can be made. However, it seems important to solve the problems arising from the use of specific methods and materials as soon as possible to improve the placing of better silver amalgam restorations.

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Pedodontics

Influence of trauma to deciduous teeth on the development of malformation in permanent teeth

Irena Szymanska-Jachimczak. *Czas.stomat.* 13:9-21 Jan. 1960

The collected data of all patients (mainly children from five to ten years old) with malformations of the permanent teeth who had been treated at the Dental Clinic of the University of Warsaw, Poland, were reviewed. The study was undertaken to determine whether acute trauma (usually caused by blows or falls) sustained by the deciduous teeth during the early period of development of the permanent tooth germs influences the occurrence of malformation in the permanent dentition.

The malformations in permanent teeth observed consisted of duplication (germination) of isolated tooth parts (mainly crowns), discoloration of the enamel, impacted or erupted supernumerary teeth (usually corresponding with the deciduous teeth which had sustained the acute trauma), and various other tooth disharmonies.

In all instances investigated, the acute trauma to the deciduous teeth had occurred during the early developmental period of the permanent tooth germs. The degree of the malformation in permanent teeth seemed to depend on the position of the tooth germs in relation to the traumatized deciduous tooth, the patient's chronological or developmental age, the state of eruption or calcification of the permanent tooth, the strength and direction of the trauma sustained, and on hemorrhages occurring in or near the developing permanent tooth germ.

Although there is little information available as to the possible regulative reactions of human tooth germs to trauma or the histologic stage during which the tooth germ may lose its capacity for normal development, it can be assumed that acute trauma to deciduous teeth plays an important part in the development of malformations in the permanent teeth.

Injuries to deciduous teeth are causative factors (or should, at least, be considered as possible causative factors) in the development of specific malformations in permanent teeth, especially

duplication of crowns and roots, extreme discoloration of the hard tooth substance, appearance of impacted or erupted supernumerary teeth, and extreme tooth mobility (rotation).

Miodowa 18, Warsaw, Poland

The use of the air driven handpiece in dentistry for children

D. J. Yeo. *J.Canad.D.A.* 26:467-473 Aug. 1960

A study designed to test the suitability of the air turbine handpiece in dentistry for children was undertaken at a children's dental clinic in Vancouver.

A Ritter Model B Airotor was installed. Each child was treated routinely in the same manner. A local anesthetic was used, a McKesson rubber mouth prop was inserted between the teeth, and the quadrant to be operated on was isolated with a rubber dam. In each child, a conventional handpiece was used for cavity preparation in one quadrant, and the Airotor for the next quadrant. After the completion of two quadrants, the average child was able to state without hesitation which type of handpiece he preferred. Of 102 children, 17 preferred the conventional handpiece and 85 preferred the Airotor.

With the Airotor, cavity preparation was carried out using air coolant only. The air coolant from the exhaust of the handpiece head was augmented by air from a syringe held by the dental assistant. No instance of apparent thermal injury to the pulp, or discomfort, was reported during the entire year.

With the conventional handpiece, average chair time was 38 minutes 52 seconds; average preparation time per quadrant was 6 minutes 43 seconds, and average cavity preparation time per surface was 1 minute 24 seconds. With the Airotor, average chair time was 37 minutes 57 seconds; average cavity preparation time per quadrant was 4 minutes 7 seconds, and average preparation time per surface was 52 seconds. Thus, with the Airotor about two and a half minutes in cavity preparation time per quadrant was saved.

The first impression gained by the operator was that even more time was saved with the Airotor. The light touch and ease of cutting probably accounted for this impression. From the operator's standpoint, the ease of operation with little pressure and maximum control makes the air-driven handpiece the more desirable one, causing less stress to both patient and operator.

During the trial period of about 13 months, the air turbine handpiece required no repairs or parts replacements. The carbide burs used with this handpiece stood up well. Over a longer period of time there will be need for rotor replacement and other minor repairs, but this handpiece promises to be economical to operate.

456 West Broadway, Vancouver, British Columbia, Canada

Roentgenology

Radiation therapy of carcinoma of the tongue

Erich M. Uhlmann and Marvin E. Weiner. *Surg.Gynec.& Obst.* 111:363-370 Sept. 1960

A series of 86 patients with carcinoma of the tongue received radiation therapy at the Michael Reese Hospital, Chicago, from 1938 to 1953. The mean age of the patients was 61 years. Of the 86 patients, 4 (4.7 per cent) had a history of syphilis. Pre-existing or coexisting leukoplakia was observed in 12 (14 per cent) of the patients. In 84 patients, a diagnosis of squamous cell carcinoma with varying grades of malignancy was made; in the other two patients, an adenocarcinoma and a lymphoepithelioma were diagnosed. There were 27 carcinomas in the anterior third of the tongue, 29 in the middle third, and 30 in the posterior third. Only one third of the patients with carcinoma in the anterior third of the tongue had lymph node involvement at the initial examination; 62 per cent of the patients with primary lesions in the middle third of the tongue showed metastatic spread to the lymph nodes, and 70 per cent of those with lesions in the posterior third of the tongue had developed metastases. In seven patients (8 per cent), metastases developed to such distant organs as the larynx, esophagus and lungs.

Treatments consisted of radium in the form of telecurietherapy with a 4 Gm. bomb or the implantation of radium in the form of low-intensity needles; 11 per cent of the patients were treated with interstitial radiation only.

The five year survival rate was 33 per cent in the group with primary lesions in the anterior third of the tongue, 18.8 per cent in those with lesions of the middle third of the tongue, and 20 per cent in those with lesions in the posterior third. The over-all salvage rate of the 84 treated patients was 23.8 per cent (two patients refused therapy). Of the 84 patients treated, 15 (17.8 per cent) died within a year after termination of therapy. If one were to exclude from the statistics the 18 patients who received radiation therapy for palliative purposes only and were not treated with a cancericidal dosage, the five year results would improve from 23.8 per cent to 30 per cent.

Unless the radical surgical treatment of carcinoma of the tongue that is now advocated shows unqualified superiority as expressed in considerably higher five year survival percentages, surgical treatment should not replace radiation therapy for carcinoma of the tongue.

Tumor Clinic, Michael Reese Hospital, Chicago, Ill.

Measurement of gonadal dose in children during intraoral radiography

Seymour H. Yale, Walter S. Moos and Michael A. Videka. *Oral Surg.,Oral Med. & Oral Path.* 13:1081-1084 Sept. 1960

This investigation provided data for the evaluation of gonadal dose in boys incident to routine clinical intraoral roentgenography at 90 kvp and 15 ma. with total filtration of 2.0 mm. aluminum equivalent. The subjects were 80 boys ranging in age from 6 to 16 years. The following data were recorded for each patient: age, weight, distance between occlusal plane and gonads, and number of individual exposures.

Gonadal dose measurements were made during routine intraoral roentgenography with an average individual exposure of 1/15 second per projection. The x-ray machine was collimated to provide a beam 2.75 inches in diameter at the cone tip with a target-skin distance of 8 inches. The gonadal exposure was recorded on Kodak personal monitoring film, type 1, placed in a holder located on the dental chair, external to the clothing and just below the region of the scrotum. A series of 6 exposures, encompassing 12 films, was made.

Total dose to the gonads per patient ranged from 0.7 mr to 5.0 mr, with an average gonadal dose of 1.6 mr. The number of intraoral films exposed per patient varied from 12 to 20, with an average of 16 intraoral films exposed. There was no apparent relationship between the patient's age and the dose to the gonads.

No correlative relationship was seen between occlusal plane-gonad distance and gonadal dose, or between weight and gonadal dose. The gonadal dose per exposure was found to decrease as the weight:height ratio increased.

The present study, conducted under relatively ideal conditions, will be expanded to encompass an investigation of integrated body-dose studies in children. For this study, a suitable phantom will be used in lieu of human subjects.

College of Dentistry, University of Illinois, Chicago, Ill.

Control of the inhibition of glycolytic activity induced by ionizing irradiation

L. Petronio, S. Esposito and G. Timossi. *Haematologica.* 44:889-895 June 1960

Ionizing irradiation induces an inhibition of glycolysis by denaturation of the two enzymes, lactic dehydrogenase and malic dehydrogenase, which play an important part in the respiration of cells.

In order to prevent, or at least, to reduce, the traumatic effects of ionizing irradiation on the respiration of cells, adenosine triphosphate (ATP) was administered to a group of albino rats at the Medical Clinic of the University of Pavia, Italy. After administration of ATP (and other adenosine derivatives), the rats were exposed to high doses of roentgen rays.

Administration of these nucleoid compounds decreased significantly the traumatic effects of radiation to all animal tissues and favorably influenced the glycide metabolism.

The zymotic activity of lactic dehydrogenase and malic dehydrogenase was determined at different times after exposure to roentgen rays. The data obtained in the experimental group were compared with those of the control group consisting of albino rats which had been exposed to identical doses of roentgen rays but had not received adenosine triphosphate or its derivatives.

The activity of the enzymes was much higher in the experimental group than in the control group whereas the trauma to tissue was significantly decreased.

Adenosine triphosphate, therefore, should be used in the roentgenotherapy of malignant tumors, especially those occurring in the maxillofacial region. This substance increases significantly the sensitivity of malignant tissues to roentgen rays and decreases the damage to the adjacent tissues.

Medical Clinic, University of Pavia, Italy

Anesthesia and analgesia

New concepts of light anesthesia

Ben Sheiner. *Anesth.& Analg.* 39:254-256 May–June 1960

In an effort to carry patients in as light a level of anesthesia as possible, it has been found that a state of anesthesia exists which is between analgesia and the surgical Stage 3 (Guedel, 1937), where the patient can respond to spoken commands. Surgical procedures are possible in this state, which has been designated the "light zone." Since the initial series of observations on 105 patients, 1,507 patients have been carried in the light zone.

Before the patient can reach the light zone, he must first be carried to at least the lower levels of Plane 1, Stage 3 of Guedel's classification. Any anesthetic agent potent enough can be used to obtain the desired depth of anesthesia. The light zone is a zone of suggestibility, and the powers of suggestion often can be employed successfully to guide the patient through the five identified zones.

Anesthesia was induced in the 1,507 patients with thiopental sodium; then the level of anesthesia was deepened with either cyclopropane or nitrous oxide and ether. Once the lower levels of Plane 1, Stage 3 were reached, the patient was maintained there for 15 to 20 minutes before being taken to a lighter stage. Anesthesia was lightened by dumping the anesthetic mixture and flushing the bag with oxygen. The patient then was maintained on a continuous flow of 50 cc. cyclopropane and 250 to 300 cc. oxygen in a closed system. Muscle relaxants were used when the peritoneum was opened and closed and whenever else they appeared necessary. The command "relax" was whispered frequently to the patient. The average patient required 18 to 21 mg. tubocurarine for surgical procedures lasting from two to five hours.

An unusual degree of relaxation could be obtained while the patient was maintained in a well self-ventilated state. Patients were well-relaxed and well-oxygenated. Normal blood pressures were maintained easily. Patients responded to voiced commands. Laryngeal spasm and bucking on endotracheal tubes did not occur. Postoperatively, patients were talking either on the table or within 15 to 30 minutes. Patients could be carried through the operation, relieved of pain, with no memory of the operative procedure, and without anesthetic trauma. Fifteen per cent of the patients experienced degrees of nausea and mild retching in their rooms after attempting to sip fluids.

141 Madison Street, Passaic, N.J.

Prevention of needle breakage during mandibular anesthesia by use of 'button' syringes

Karl Helbig. *Deut.Zahnärztebl.* 14:171-176 March 22, 1960

To prevent injection needles from penetrating too deeply into oral tissue—an accident frequently caused by sudden needle breakage—several authors have recommended the use of the so-called "button" syringes. The number of patients referred to hospitals for surgical removal of broken needles, or of needle fragments, could be significantly decreased if the use of button syringes would be accepted generally in dental practice, especially for producing local anesthesia of the mandible.

In dental literature, the use of syringes with a needle length of from 40 to 100 mm. has been recommended. For mandibular anesthesia Braun-Läwen (1951) suggested that needles of sufficient length to permit the syringe proper to always remain outside the oral cavity be used.

In German dental practice, needles of various length (40, 50, 60, 80 and 110 mm.) are used. Most of these injection needles and syringes, however, are imported because German dental manufacturers uniformly produce injection needles 42 mm. long for local anesthesia of the mandible. Although this needle length can be regarded as adequate for most anesthetic purposes at the dental office, the use of longer needles

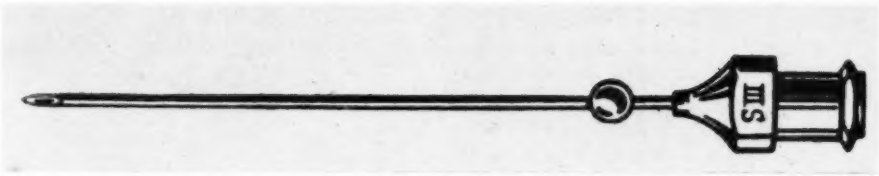

Figure 1 Dental syringe with safety button, produced in the United States

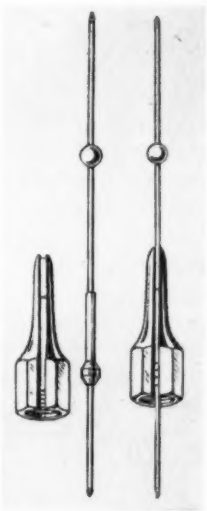

Figure 2 Dental syringe with safety button, designed by Fischer

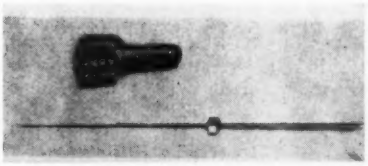

Figure 3 Dental syringe with safety button, designed by Neuhaus

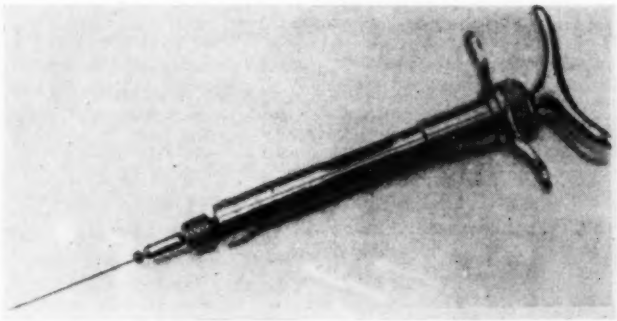

Figure 4 Dental syringe with safety button, produced by S. S. White

(at least 55 mm.) would provide a more favorable and safer anesthesia.

The use of the button type syringe (Fig. 1), produced in the United States, accomplishes two different purposes: (1) the button provides complete safety and easy control, thereby preventing damage to soft and hard tissues in the oral cavity and trauma to the facial nerve, and (2) the button holds the needle securely in position, and in instances in which needle breakage occurs, prevents the disappearance of needle fragments into tissues.

To obtain an adequate local anesthesia of the mandible, if button syringes are used, it seems unnecessary for the needle to penetrate the tissue deeper than 2.5 cm. However, if the safety button of the syringe serves as control to prevent disappearance of the needle, it seems desirable to fix the distance between button and injection point at a somewhat greater length. With the button at a distance of from 35 to 45 mm. from the point of a needle 55 mm. long, the button will provide precise positioning of the needle and regulation of the depth to which the needle will penetrate.

The general use of syringes with safety buttons for dental practice was especially recommended by Engel (1950) who stated that in modern dentistry the use of syringes without such safety devices can no longer be regarded as justified. Neuhaus (1958) demanded that all local dental anesthesias should be performed with button syringes. Fischer (1950) designed the first German button syringe for mandibular anesthesia (Fig. 2). This syringe was provided with a specific screw attachment which modifies the design proposed by Neuhaus (Fig. 3). Both patterns, however, vary considerably from the cylindric safety button design recently produced by S. S. White (Fig. 4). The American syringe seems to have solved the problem completely. Similar improvements in design should be developed by German manufacturers because such syringes have definite advantages over those instruments used at present in German dental practice for mandibular anesthesia.

The use of button syringes would save the German dentist may difficulties and vexations.

It may be concluded that a great number of accidental needle breakages, causing serious complications and requiring immediate surgical removal of fragments, could have been avoided if the button syringes had been accepted generally. All recently developed types of button syringes have proved advantageous clinically and experimentally.

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Halothane anesthesia

A. R. Hunter. *Anaesthesist-Berlin* 9:175-181 May 1960

Halothane (Fluothane), a volatile, noninflammable inhalation anesthetic, was synthetized by Suckling and co-workers in 1953, after Ferguson (1951) had described the relation between the drug's physical properties and pharmacologic effects. The anesthetic agent is four times as potent as ether and twice as potent as chloroform, far easier to administer than other anesthetics, and produces a reasonable amount of muscular relaxation.

Induction of halothane anesthesia usually is rapid and smooth. The vapors of the anesthetic concentration are not unpleasant to most patients and do not irritate the oral mucosa. The drug depresses the salivary and mucous secretions.

The rapidity of recovery from halothane anesthesia constitutes one of the most valuable properties of the drug. With proper dosage there is no prolonged period of postoperative hypotension.

Premedication before halothane anesthesia requires no change from the methods used if other inhalation anesthetics are employed.

The drug's side effects on blood pressure, pulse rate and respiration, although they may be occasionally serious, can be foreseen and prevented by careful control of the patient during surgical intervention.

Because of its chemical structure, that of a halogenated hydrocarbon, halothane either alone or in conjunction with nitrous oxide, is not an anesthetic agent to be used by a light-hearted or careless operator; but in the hands of an experienced anesthetist who will pay the necessary attention to his patients, the drug obtains results far superior to those of other inhalation anesthetics. Halothane can be administered by either the

semiclosed or the direct flow method. After surgical anesthesia has been achieved, concentrations of from 0.5 to 1.5 per cent halothane are sufficient for undisturbed maintenance. Use of the drug in children less than six years old is not considered advisable.

Department of Anaesthesia, Royal Infirmary, Manchester, England

Mouth-to-mouth or Holger-Nielsen's resuscitation method?

Henning Poulsen. *Anaesthesist-Berlin* 9:141-144 April 1960

The value and applicability of two resuscitation methods—(1) mouth-to-mouth breathing, and (2) back pressure and arm lift (Holger-Nielsen's method)—were investigated at the department of anesthesiology of the University of Aarhus, Denmark.

Several comparative experimental studies were carried out on five normal unconscious apneustic adult patients, and extended over periods of from 20 to 40 minutes.

Tidal air, minute volume and alveolar ventilation per minute were determined pneumographically, spirometrically and volumetrically.

Oxygen saturation and carbon dioxide tension of the arterial blood were recorded during each experiment.

Sufficient alveolar ventilation with normal arterial oxygen saturation and carbon dioxide pressure tension was obtained by mouth-to-mouth breathing in four of the five patients.

Sufficient alveolar ventilation with normal arterial oxygen saturation and constant carbon dioxide pressure was obtained by Holger-Nielsen's method in one of the five patients. In four patients, variable degrees of hypoventilation occurred during the performance of the manual procedures with a significant increase in the carbon dioxide pressure of the arterial blood. However, an arterial oxygen saturation of more than 80 per cent could be maintained throughout the experimental period (from 30 to 40 minutes), although resuscitation with atmospheric air had to be given during the greater part of the period.

On the basis of the results of the experiments, the author agrees with American investigators in their recommendation of the mouth-to-mouth method, especially in infants and young children. It would be desirable to train dental and medical practitioners to become "two-method" resuscitation operators.

Department of Anesthesiology, University of Aarhus, Denmark

Nitrous oxide anesthesia at the dental office

München.med.Wschr. 102:1300-1301 June 24, 1960

Q.—Are there disadvantages in the routine use of nitrous oxide anesthesia at the dental office after the patient's physical and psychic conditions have been found fully satisfactory?

A.—For most procedures performed at the dental office, nitrous oxide and oxygen anesthesia still is the method of choice. Although many new agents have been added to the long list of available inhalation anesthetics, nitrous oxide and oxygen meet the requirements for office anesthesia best because of the high degree of safety, rapidity of action, quick recovery and minimal deleterious effects. Some authors report that nitrous oxide and oxygen anesthesia is more likely to injure the nervous system than other forms of anesthesia and that definite damage to the liver may be sustained if high percentages of nitrous oxide and low percentages of oxygen are used. Such damage can be prevented by adequate premedication (barbiturates), and by using as large a percentage of oxygen as possible with the nitrous oxide. However, this form of inhalation anesthesia at the dental office is contraindicated in patients with a history of methemoglobinemia (insufficient oxygenation of the blood), visible cyanosis, and cardiac or circulatory disorders.

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Therapeutics

Susceptibility of staphylococci to chloramphenicol: a survey of experimental and clinical experiences

Myron W. Fisher. *A.M.A.Arch.Int.Med.* 105:413-423 March 1960

A survey of various experimental and clinical observations by American, British, Canadian and French authors revealed that there may be a unique relationship between the antibiotic chloramphenicol and staphylococci in regard to the generally observed infrequency of resistant strains.

Based on 78 reports which have appeared in the last five years in the dental and medical literature, the following conclusions have been reached:

1. The actual incidence of staphylococci which are truly resistant to chloramphenicol may be exaggerated by the uncertainty of test methods used and criteria applied.

2. Experimentally, staphylococcal resistance to chloramphenicol develops slowly and only to a moderate degree. This suggests an intrinsic inability of specific strains of staphylococci (especially those present in the oral cavity) to acquire resistance to chloramphenicol.

3. In man, strains of staphylococci resistant to chloramphenicol occur infrequently. In instances in which such strains have been observed, they show a moderate degree of resistance. In some instances, they tended to back-mutate to a state of susceptibility, and they responded immediately to increased dosages of chloramphenicol in experimentally produced infections of the oral cavity.

4. Contrary to the previously favored hypothesis, the incidence of staphylococcal resistance to chloramphenicol does not appear to be related to the frequency and intensity of the use of this antibiotic.

The principal aim of this survey was to obtain a better understanding of the susceptibility of staphylococci to chloramphenicol. It is not implied, however, that strains of staphylococci (especially of *Staphylococcus pyogenes* var. *aureus*) resistant to chloramphenicol do not exist. The survey indicates that in the consideration of the choice of an antibiotic for the dental or medical treatment of a staphylococcal infection, the problem of antibiotic resistance can be regarded as minimal if chloramphenicol (which has an antibacterial activity similar to that of the tetracyclines) is used.

[Since other antibiotics are available which are equally effective against dental infection, it is advisable to avoid the systemic use of this antibiotic in dental practice. No products containing this drug are currently accepted by the Council on Dental Therapeutics of the American Dental Association.]

Parke, Davis & Co. Research Laboratories, Detroit 32, Mich.

Sensitivity of hemolytic staphylococci to a series of antibiotics: a three-year progress report

Robert G. Petersdorf, Mary C. Ross, Harvey B. Minchew, Willis R. Keene and Ivan L. Benett. *A.M.A.Arch.Int.Med.* 105:398-412 March 1960

The sensitivity of 300 strains of staphylococci, including 150 strains obtained from patients with oral infections, 50 strains from carriers with recent infections and 100 strains from asymptomatic carriers, was tested at the Johns Hopkins Hospital in Baltimore, Md., against penicillin, erythromycin, chloramphenicol, tetracycline, neomycin, bacitracin, oleandomycin, Signemycin, novobiocin, kanamycin, vancomycin, ristocetin and leucomycin.

A tube-dilution technic with determinations of the bacteriostatic and bactericidal activity was employed.

Although many staphylococcal strains were found resistant to penicillin, nearly 50 per cent of these strains appeared to be sensitive to this antibiotic if 50 units per milliliter were used. Among the more recently introduced antibiotic agents, vancomycin and kanamycin proved to be

potent bactericidal agents, whereas novobiocin, oleandomycin, ristocetin, and leucomycin inhibited the growth but did not destroy most of the staphylococcal strains.

No increase in the bacterial resistance to chloramphenicol and erythromycin has been observed.

Microorganisms present in the oral cavity, lysed by bacteriophage 81, were uniformly resistant to high concentrations of penicillin and tetracycline. This specific staphylococcal strain also tended to be slightly more resistant to most other antibiotic agents.

In general, the results of tube-dilution sensitivity tests were in agreement with those obtained by routine disk tests.

Severe systemic staphylococcal infections acquired outside a hospital or caused by bacteriophage types other than bacteriophage 81, should be treated with large doses of penicillin, from 20,000,000 to 40,000,000 units daily in conjunction with probenecid, and a second antibiotic agent such as chloramphenicol or erythromycin may be added to the regimen.

The Johns Hopkins Hospital, 601 North Broadway, Baltimore 5, Md.

Melena vera caused by aspirin

Anne Fröhlich. *Ugeskr.laeg.* 74:178-181
April 7, 1960

In 1939, Douthwaite drew the attention of the medical and dental profession to the clinically demonstrated fact that acetylsalicylic acid (aspirin) frequently causes melena vera manifested by the passage of black, pitchy and grumous stools stained with blood particles.

This and other side effects of the drug were investigated in 74 healthy subjects. Five days before the test was initiated, all meat products in the diet were dispensed with because animal flesh or blood may produce similar symptoms.

For 30 days, 1 Gm. of acetylsalicylic acid was administered twice daily to each subject. It was established that the drug is not free from side effects such as allergic reactions, acute edema of the upper respiratory tract including the oral cavity or of the face, and necrosis of the oral mucosa.

The presence of blood in the feces was established by the benzidine test.

After an interval of one month, the investigation was repeated with the same dosage of the drug. All 74 subjects were examined for the presence of melena vera five times. During the first month, occult hemorrhage in the gastrointestinal tract leading to melena was demonstrated in 25 subjects (33 per cent), and during the second month, in 37 subjects (50 per cent). The result of the investigation suggests that even a healthy intestinal tract may react to acetylsalicylic acid by occult hemorrhage.

For analgetic or antipyretic purposes far more effective drugs are available such as the narcotics.

Kristianiagade 12, Copenhagen O, Denmark

Antibacterial effects of tetracycline and oleandomycin

G. K. Daikos, M. Athanasiadou
and E. Triantaphylli.
Deut.med.Wschr. 85:969-972
May 27, 1960

The bactericidal and bacteristatic action of two antibiotic agents, tetracycline hydrochloride and oleandomycin phosphate, were tested in vitro at the Alexandra Hospital of the University of Athens, Greece.

These tests were made with 253 bacterial strains obtained from NIH swabs used at the hospital for collecting suspicious material from the mucous membranes of the oral cavity and the upper respiratory tract of patients with oral infections.

Among these 253 strains were 154 of *Staphyloccocus pyogenes* var. *aureus;* 40 of *Escherichia coli;* 9 of *Alcaligenes faecalis;* 12 of *Proteus vulgaris;* 29 of *Salmonella typhi,* and 9 of *Pseudomonas aeruginosa.* All these strains were isolated and identified in serial dilutions on a solid agar nutrient medium.

The sensitivity of the various bacterial strains was measured in dilutions of both antibiotics from 0.3 to 20 microns per milliliter. When tested in combination, the two antibiotics were mixed in the usual proportion, that is two parts of tetracycline to one part of oleandomycin.

Of the 154 strains of *Staph. pyogenes* var. *aureus,* 102 were sensitive to both antibiotics, 36

were sensitive only to oleandomycin, 5 only to tetracycline, whereas 11 strains were resistant to both antibiotics.

Of the 99 strains of other microorganisms, 59 were sensitive only to tetracycline, and 40 were resistant to both antibiotics.

Of the 16 strains of *Staph. pyogenes* var. *aureus* resistant to oleandomycin, 5 were sensitive to tetracycline.

In this experiment, no evidence of a true synergism of the two antibiotic agents could be demonstrated, although certain additive bacteriostatic effects of the antibiotic combinations were observed against 110 of the 253 bacterial strains. Those additive effects, however, could not be considered as significant because the evaluations were within the margins of measurement errors. Similarly lacking in significance was the antagonism between the two antibiotics observed in 87 strains. The joint action of the two antibiotics in combinations was never greater than the sum of their isolated effects.

Both antibiotic agents can be recommended for the treatment of a variety of oral infections caused by pathogenic microorganisms, especially staphylococci which often are resistant to erythromycin, penicillin, streptomycin or other antibiotics used in dental practice.

Alexandra Hospital, University of Athens, Greece

Hydrocortisone spray in the treatment of lesions of the oral mucous membrane

H. P. Philipsen and J. J. Pindborg. *Tandlaegebl.* 64:311-318 May 1960

Twenty-nine patients with aphthous, bullous or erythematous oral lesions were subjected to local treatment with hydrocortisone. The steroid preparation used was an aqueous solution of hydrocortisone acetate (0.2 mg. per milliliter). This solution was sprayed from an ordinary dental spray.

The patients were treated once a day for a period ranging from four to eight days. Each daily treatment consisted of three successive sprayings. The fluid from each spraying was kept in the mouth for four to five minutes; the patient was instructed to keep the solution continuously in motion, but not to swallow the solution and not to rinse the mouth during or after the completion of the treatment.

Patients with lesions involving the lips and the angles of the mouth were instructed to apply hydrocortisone ointment three times a day. Two patients with chronic desquamative gingivitis were treated with both spray and ointment. One patient with gingival hyperplasia resulting from the administration of diphenylhydantoin sodium was subjected to gingivectomy and then treated by having hydrocortisone ointment massaged into the gingivae daily for ten days.

In 27 of the 29 patients, the symptoms were relieved considerably after only one or two days of treatment. In some patients, the palliative effect was evident within half an hour after treatment. In 16 patients, healing of the lesions seemed to be accelerated.

Those patients with recurrent aphthous ulcerations who had "attacks" after hydrocortisone treatment reported that the recurrences were less severe and that the intervals free of symptoms were longer.

The therapeutic action of hydrocortisone on desquamative gingivitis was transient, which suggests that local hydrocortisone treatment is not suitable for chronic oral lesions.

The patient treated for gingival hyperplasia traceable to diphenylhydantoin sodium reported no recurrence when seen six months later.

No side effects were noted which could be ascribed to the local application of steroids.

Royal Dental College, Copenhagen, Denmark

Contraindications to the use of certain drugs in pilots and drivers

D. Evrard. *Brux.mèd.* 25:76-78 June 1960

Physicians and dentists should be aware that the use of certain drugs in pilots should be avoided because the side effects such as drowsiness, depression of the central nervous system, sudden increase in body temperature, asthma, high fever (and other allergic reactions), rise in blood pressure, blurring of vision and loss of consciousness are hazards to the pilot, the crew and passengers.

These dangers are of particular importance to fighter pilots, especially those who fly without a

co-pilot. However, even if a co-pilot is present, the pilot of a military or commercial plane is often responsible for the lives of many persons.

The list of drugs contraindicated for pilots includes: (1) antihistamines; (2) vasoconstrictors and hemostatics, especially if injected into the oral or nasal mucosa; (3) antimalarial agents; (4) atropine, scopolamine and other related anticholinergic agents; (5) antibiotics which may affect the equilibrium and the sense of hearing; (6) sulfonamides whether topically or systemically applied; (7) stimulating agents which affect the mental ability to judge or to decide, and (8) sedatives and hypnotics including ataraxics and relaxants.

Physicians and dentists should not administer any of these drugs listed to a patient who expects to drive a car immediately after the visit at the office. Strict observance of this warning will prevent or, at least, reduce traffic accidents.

141 Rue Belliard, Brussels, Belgium

Erythema multiforme exudativum associated with the use of sulfamethoxypyridazine

Sidney Q. Cohlan. *J.A.M.A.* 173:799-800 June 18, 1960

The author's observation of three patients (between 18 months and 28 years old) with erythema multiforme exudativum (Stevens-Johnson syndrome) occurring after administration of sulfamethoxypyridazine (Kynex), and the knowledge of at least two similar instances observed by other authors, seem to suggest that a causal relationship exists between the syndrome and the administration of this specific drug.

In all five case reports presented, the fact was emphasized that the syndrome developed almost immediately after the administration of sulfamethoxypyridazine was initiated. On the second day of therapy, an erythematous maculopapular eruption appeared. Vesiculation of the facial skin lesions, vesico-desquamation of the oral mucosa, severe conjunctivitis and urethritis with dysuria developed on the third day. A diagnosis of erythema multiforme exudativum was made in all five instances. In four patients, pyrexia, toxicity and skin lesions seemed to respond to steroid therapy. However, friable, bleeding lesions of the oral mucosa continued for several weeks. In one instance, however, the patient, a nine year old girl, died on the twelfth hospital day in spite of vigorous electrolyte and steroid therapy.

Although there are pitfalls in attributing a causal relationship to a drug in a syndrome of unknown etiology such as erythema multiforme exudativum, the serious manifestations (one death out of the five instances reported) unquestionably requires more critical evaluation of the clinical use of this drug.

Two similar instances were described by R. C. Garner after preparation of this report.

550 First Avenue, New York 16, N.Y.

Pigmentation of the nail-beds, palate and skin occurring during malarial suppressive therapy with 'Camoquin'

C. H. Campbell. *M.J.Australia* 47:956-959 June 18, 1960

The author in a previous communication (1959) noted the occurrence of a bluish-grey pigmentation of the face and neck, the nail beds of the toes and fingers and the palate during long-term malarial suppressive therapy with amodiaquine hydrochloride (Camoquin).

The pigmentation on the palate is of a bluish-grey to almost black color and affects the mucous membrane of the hard palate. It commences as irregular patches or streaks of pigment on one or both sides of the midline of the arch of the palate. These streaks of pigment may eventually coalesce to form a dark band, half an inch wide on either side of the midline, which commences one inch behind the incisors and extends back to the posterior border of the hard palate. Sometimes a fine line of pigment extends laterally and backward from the main pigment mass to the last molar on either side.

To determine the approximate incidence of pigmentation on the four sites, an investigation was undertaken.

Of 65 men and 35 women who had been taking amodiaquine regularly for periods varying from five weeks to over six years, 40 showed evidence of pigmentation at one or more of the four principal sites. The commonest site was the nail bed of

the great toe (29 patients). Next in incidence came the mucous membrane of the hard palate (27 patients), the nail beds of the fingers (18 patients) and the skin of the face and neck (8 patients).

Of 291 children who had been taking amodiaquine for from two months to over five years, 12 (6 boys and 6 girls) showed evidence of pigmentation of the palate. Its incidence increased with the duration of the course of treatment.

The incidence of pigmentation of the palate among 94 children who had been taking amodiaquine regularly for three years or more was 11.7 per cent. No pigmentation of the palate was seen in 423 children who either were not taking any malarial suppressive drug or were taking chloroquine, proguanil hydrochloride or pyrimethamine.

General Hospital, Port Moresby, New Guinea

Increased stress and effectiveness of placebos and 'active' drugs

Henry K. Beecher. *Science* 132:91-92 July 8, 1960

This study is based on the proposition that pain of a pathologic origin produces more anxiety, or stress, than experimentally contrived pain produces.

In 13 studies embracing 173 subjects in whom pain was induced experimentally, the average percentage of patients relieved with placebos was 3.2 ± 1.8 per cent. The mean percentage effectiveness of placebos in relieving pathological pain is over ten times that found with experimental pain.

Placebos, being inert agents, can affect only psychologic processes. The assumption is that when the psychologic component of a situation is important the placebo will have a correspondingly greater opportunity to produce an effect, and this appears to be true.

Effects similar to those of a placebo can be found with an "active" drug; for instance, morphine, even in large doses, does not dependably relieve pain of experimental origin in man. Morphine in smaller doses is highly effective in relieving pain of pathologic origin. Pathologic changes alone often are not enough to give rise to pain. The psychologic significance to the subject determines the pain experienced.

Certain drugs are effective in relieving visceral sensations only if an essential psychologic state is present. Although the nature of this state cannot be defined exactly, it appears to be related to the significance of the symptom, to anxiety and to stress. Similarly, certain common symptoms, pain, for example, appear to emerge only if an essential psychologic state (anxiety, stress) is present. Physiologic derangement (stimulation of pain endings) is not enough.

Harvard Medical School, Boston, Mass.

Effect of antihistaminic agents on inflammatory response after surgical trauma

Bernard S. Snyder. *J.Oral Surg.,Anesth. & Hosp. D.Serv.* 18:319-326 July 1960

Forty patients with bilaterally similar unerupted or partially erupted mandibular third molars were employed in a clinical study designed to evaluate the ability of antihistamines to reduce postoperative swelling and pain. Each patient served as his own control, receiving an antihistamine for the removal of one tooth and a placebo for the removal of the other. All surgical interventions were performed by the author. Patients were seen postoperatively at 24, 48 and 96 hours. Observations were recorded on the amount of edema, trismus, bleeding, temperature and white blood cell count, and analgesics and healing.

The following antihistamines were used: promethazine hydrochloride, tripelennamine hydrochloride and chlorprophenpyridamine maleate.

The results obtained indicate that the antihistaminic drugs do not alter appreciably the postoperative course. Apparently, the ability of antihistamines to control postoperative pain, edema, trismus, healing or bleeding has been overrated. The results suggest that histamine is not always the primary factor in producing the inflammatory response after trauma, but only one of several interrelated substances having an effect on the inflammatory response.

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Oncology

Behaviour of malignant cells to irradiation therapy in carcinoma of the oral cavity

K. Sundaram and K. S. Rijhsinghani.
Indian J.M.Sc. 14:201-204 March 1960

To observe the response to roentgen-ray radiation of malignant cells, ten patients with oral cancer were studied at the Tata Memorial Hospital. Each patient received 200 r daily, six days a week, until the total dosage of 4,200 r had been administered. Smears were prepared from the lesion on every fourth day of treatment, and studied histologically.

The cell types were classified into the following groups:

Type I. Daughter cells, malignant cells with a prominent nucleus and a thin rim of cytoplasm. The nucleoli are indistinct and contain a minimum amount of ribonucleic acid (RNA).

Type II. Cells with late interphase nuclei. These malignant cells have a well marked nucleolar RNA and plenty of cytoplasm.

Type III. Degenerating cells. These cells exhibit vacuolation or lysis of nuclear membrane. The cytoplasm of these cells generally manifests an excessive accumulation of RNA.

Pretreatment smears in all ten patients revealed an abundance of malignant cells of Types I and II, and few Type III cells.

The response to roentgenotherapy differed. In seven patients there was a decrease in the number of Type I cells and an increase in the number of Type II cells; this condition persisted until the end of treatment. Cytologically, this type of response was considered inadequate; in six of these seven patients, recurrence of the cancer occurred within a few months after therapy.

A different cytological response was observed in three patients. The Type I cells disappeared and a pronounced drop in Type II cells occurred. This response was evident as early as nine days after the beginning of treatment (1,800 r). Subsequent smears contained only degenerating cells. The response in these three patients was regarded as favorable. Clinically, the lesions in these three patients had healed completely. No evidences of recurrence were observed during the first one year after therapy.

This cytologic method may be considered useful in evaluating the chances of curability of malignant neoplasms.

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Benign and malignant neurilemmomas of the head and neck

Lyle V. Kragh, Edward H. Soule and James K. Masson. *Surg.Gynec.& Obst.* 111:211-218 Aug. 1960

From 1910 through 1957, there were 148 benign neurilemmomas of the head and neck, in 143 patients, seen at the Mayo Clinic. Neurilemmomas are tumors of the neurilemma (Schwann's sheath), and do not arise from the axis cylinders. The characteristic lesion is a solitary encapsulated benign tumor which occurs along the course of a peripheral, cranial or sympathetic nerve. The small tumors usually are solid, but the larger tumors often exhibit spontaneous degeneration and hemorrhage. All tumors are encapsulated, and the cut surface of the tumor varies in color from a homogeneous solid gray-white to a mottled red or from yellow to tan, with or without cystic spaces. The size of these tumors is variable; in this series the tumors ranged from 0.3 cm. in diameter to 10 by 9.5 by 5.5 cm.

Neurilemmomas are seen most frequently about the head and neck. Most neurilemmomas are readily accessible and simple surgical enucleation, if complete, is sufficient; recurrence is not to be expected, even if a portion of the capsule cannot be excised completely. These tumors are resistant to radiation. Malignant degeneration rarely occurs.

The ages of the 143 patients ranged from 5 to 75 years, and the average age was 44.6 years. Sixty patients (42 per cent) were men and 83 (58 per cent) were women.

Twelve neurilemmomas, all smooth, firm and covered with mucosa, arose from the oral cavity.

Five of the 12 tumors were situated in the tongue and were 1.5 cm. or less in greatest dimension. Four patients had noted a mass for from 1 to 15 years and the fifth patient experienced dysphagia for one year because of a tumor in the base of the tongue. In none of these five patients could the exact nerve of origin be determined. The condition of the patients has been followed for periods of from 3 to 18 years, and recurrent tumors have not developed.

In four patients, the tumors were located in the floor of the mouth. The masses varied from 1 to 4.5 cm. in greatest dimension and had been known to be present for from 4 months to 15 years. In none of these four patients could the exact nerve of origin be determined. Recurrence has not been noted during the follow-up period of from 10 to 19 years.

One neurilemmoma arose in the mandible and two in the cheek and the region of the upper jaw. Simple enucleation of these tumors was sufficient to cure the patient; no recurrence has taken place during the follow-up period of from 6 to 18 years.

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Recurrent tumors of the maxillofacial region

V. Popescu, C. Burlibasa, C. Gall, M. Iancu and S. Stănascu. *Zahnärztl.Praxis* 11:135-136 June 15, 1960

Dental practitioners and oral surgeons encounter specific problems in the diagnosis and treatment of patients with benign and malignant tumors of the maxillofacial region. The difficulties usually are associated with sites which are difficult to observe and to approach, with a clinical picture which often is misleading, and with a comparatively high incidence of tumor recurrence.

Statistical evaluations of the case histories of 514 patients with tumors of the maxillofacial region, who were treated at the Oral Surgery Clinic of the University of Bucharest, Romania, revealed the following data:

1. Distant metastasis from primary oral or facial tumors occurred only in three patients. One metastasis was in the lung, one was in the stomach, and one was in the cervical region of the spinal cord.

2. In 200 (143 men and 57 women) of the 514 patients, the tumor recurred after treatment.

3. Recurrent tumors appeared in two patients less than 12 years old, in nine patients between 12 and 20 years old, in 18 patients between 20 and 30 years old, in 16 patients between 30 and 40 years old, in 51 patients between 40 and 50 years old, in 53 patients between 50 and 60 years old, and in 51 patients more than 60 years old.

4. Recurrent tumors appeared on the lower lip in 66 patients (63 men and 3 women), the upper jaw in 37 patients (16 men and 21 women), the lower jaw in 25 patients (17 men and 8 women), the face in 23 patients (17 men and 6 women), parotid gland in 13 patients (8 men and 5 women), the inner cheek in 8 patients (4 men and 4 women), the upper lip in 1 patient (man), other oral or facial sites in 15 patients (5 men and 10 women).

5. Histologically, the recurrent tumors were classified as sickle cell carcinoma in 79 patients (71 men and 8 women), undifferentiated carcinoma in 29 patients (19 men and 10 women), basaloma in 13 patients (8 men and 5 women), cylindroma in 13 patients (3 men and 10 women), myxoma (malignant) in 4 patients (1 man and 3 women), osteosarcoma in 1 patient (woman), fibrosarcoma in 6 patients (4 men and 2 women), fibrochondroma in 1 patient (man), reticuloendothelioma in 1 patient (man), polymorphous sarcoma in 3 patients (1 man and 2 women), melanosarcoma in 1 patient (man), lymphosarcoma in 1 patient (man), and nonspecific tumors in 32 patients (23 men and 9 women).

6. Recurrent tumors appeared after roentgenotherapy or radium irradiation in 68 patients (35.5 per cent); after oral surgical interventions in 96 patients (48 per cent), and after combined irradiation and surgery in 36 patients (18 per cent).

7. Recurrent tumors appeared in 107 patients once, in 75 patients twice, and in 18 patients three times.

8. The majority of recurrent tumors appeared six months after treatment.

9. Surgical enucleation and resection (even if extreme tissue losses were involved) have been the methods of choice, and have prolonged the life of the patients for from five to eight years.

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Orcein as a selective stain for epithelial attachment cuticle

Harold M. Fullmer and Frederick W. Wertheimer. *Stain Tech.* 35:156-158 May 1960

During the course of histochemical investigations of elastic and oxytalan fibers of the human periodontium, it was noted that the epithelial attachment cuticle reacts brilliantly and selectively with orcein in sections stained by the Taenzer-Unna method (Lillie, 1954).

Efforts to prevent the cuticle from staining by the use of several blocking reagents and enzymatic digestions were unsuccessful.

Whereas the epithelial attachment cuticle is selectively stained with orcein, the keratinized and parakeratinized layers of the oral mucosa remain unstained. This demonstrates a component or end group in the epithelial attachment cuticle not present or available in keratinized or parakeratinized oral mucosa. Also, hair and skin keratins are not stained with orcein.

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Appearance of tooth surface as observed in shadowed replicas

Fritz Mannerberg. *Odont.Revy* 11:Sup.6:1-116 1960

The purpose of this investigation was to study the microscopic appearance of the tooth surface and changes in appearance under certain conditions.

On examination of the appearance of the tooth surface in vivo in three age groups (8, 13 and 18 years old), the following observations were made:

1. The area of the tooth surface showing perikymata was smaller in the older age group.

2. The frequency of tooth surfaces showing horizontal scratches increased.

3. The area of the tooth surface involved by plaques decreased with increasing age.

A correlation was found between toothbrushing habits and area of the tooth surface showing perikymata. In persons who brushed their teeth at least once each day for at least a year, the area of the tooth surface showing perikymata was smaller than in those who never brushed their teeth.

On examination of tooth surfaces of different appearance for changes during periods of up to six years, the following observations were made:

1. In some instances the tooth surface showed no microscopic changes during the six year period; the tooth surface showed perikymata, dental plaques and only few scratches. This may be explained by the assumption that toothbrushing was not effective enough to keep the surface clean from plaques, but caused no mechanical damage.

2. In some instances, perikymata pattern observed at the first registration had disappeared at the second registration, the surface being horizontally scratched.

3. In some instances, abrasion of the tooth surface was estimated at 9 microns during a period of five to six years.

These findings support the earlier assumption that surface appearance may vary more with toothbrushing habits than with age.

On examination of the tooth surface for changes in association with toothbrushing in vitro under conditions resembling those in vivo, the following observations were made:

1. Newly extracted, clinically and microscopically intact teeth were abraded at the rate of 2 to 2.5 microns per hour when brushed with a dentifrice containing insoluble abrasives.

2. When the same type of teeth were brushed without dentifrices for ten hours, no scratches appeared on the surface. Changes in the appearance of the surface did occur, however, which suggested that the organic cuticle may have been worn down.

On examination of the tooth surface for changes in association with toothbrushing in vivo, the following observations were made:

1. New horizontal scratches appeared on the

tooth surface when the dentifrice used contained abrasives, soluble or insoluble in saliva.

2. When the teeth were brushed without a dentifrice, a brown cuticle developed on the tooth surface which could not be removed by further brushing without dentifrices.

3. Comparison of the appearance of the scratches in teeth brushed in vitro and in vivo showed that in the teeth brushed in vitro the characteristic signs of prism ends could be seen in the scratches even when the enamel had been abraded. In the teeth brushed in vivo the prismatic pattern was, as a rule, no longer detectable in the bottom of the scratches.

4. In the tooth surfaces of many people, old scratches disappeared simultaneously with the appearance of new ones.

On examination of the appearance of the tooth surface in clinical instances of erosion the following observations were made:

1. The tooth surface showed no perikymata.

2. The area of clinical erosion was pitted. The pits probably were hollowed out prism ends.

3. Only a few scratches were seen, except in those instances in which the erosion had involved the dentin, and in these instances the surface was noticeably scratched.

4. In other parts of the tooth surface, usually incisal to the clinical erosions, regions were observed which seemed to be more even and void of details, showing only faint signs of prism ends. These areas were called "latent" erosion.

5. In some instances of clinical erosion, the tooth surface did not show the afore-mentioned pits.

In a repeated study of the 269 persons observed in the age group investigated, two were found with a tooth surface of the type seen in erosion. Both subjects were 18 year old girls. This confirmed the clinical observation that erosion is relatively uncommon.

A study of changes in the tooth surface in instances of erosion showed that the typical appearance of erosion persisted unchanged during the periods studied.

Examination of the appearance of the tooth surface after exposure to juices of citrus fruits in vivo and subsequent toothbrushing showed that:

1. Orange juice produced no changes in the appearance of the tooth surface.

2. Lemon juice produced no changes in some of the subjects, whereas in others it changed the surface of the tooth completely.

There are 85 references and 81 illustrations.

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Studies on the number and the caliber of dentinal tubules just below the dentinoenamel junction of human deciduous and permanent molars

Kiyoshi Miake, Asaharu Shimada, Shohei Higashi, Shinji Takeda, Hajime Sato, Minoru Kume, Hideo Otsuki and Kenji Toyama.
Shikwa Gakuho. 60:72-78 May 1960

Ninety transverse ground sections through the coronal portion of human deciduous and permanent molars were prepared. The number and caliber of dentinal tubules which were sectioned transversely nearly at right angle to the direction of the tubules just below the dentinoenamel junction were ascertained.

At the dentinoenamel junction of permanent molars there are about 15 dentinal tubules in an average square measuring 40 microns on each side. In a corresponding area in deciduous molars, the average number of dentinal tubules is 18.

The average diameter of the tubules in deciduous molars is 1.23 microns, and in permanent molars it is 1.10 microns.

Ground sections from various types of permanent teeth were examined, and it was found that the first molars contained more dentinal tubules than the other types of permanent teeth.

No pronounced differences were found in the diameters of dentinal tubules just below the dentinoenamel junction in buccolingual and mesiodistal areas in deciduous and permanent teeth.

The diameters of dentinal tubules do not change with age.

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Strontium 90 and fluoridated water

Editorial. *Am.J.Pub.Health* 50:868-869
June 1960

An objection to the fluoridation of water, first proferred by Kerwin in 1958, capitalizes on the alarm over radioactive fallout from atom bomb tests. Kerwin's suggestion depicts strontium 90 fluoride deposition in the bones of those who drink fluoridated water, thereby increasing the content of radioactive strontium in the bone and the consequent danger. This science wonder story thus combines in a single fallacious statement the fear of the effects of radiation with the fear of the effects of fluorine.

Although both fluorine and strontium are deposited and retained in bone, the mechanisms of deposition of these two elements are separate and independent.

No calcium fluoride crystals can be found in bones or teeth, even when experimental animals are maintained on diets or given drinking water containing so much fluorine that the animals are barely able to survive.

Only a relatively few strontium 90 atoms are found along with the stable strontium 85 in the blood and bone. However, at the strontium concentration of blood, the fluorine content of blood would have to be increased about 10,000 times to precipitate strontium fluoride. Such a fluoride concentration would be lethal several times over. On the other hand, the strontium concentration of the blood would have to be increased about 10 billion times in order to precipitate strontium fluoride at the normal levels of blood fluorine. The precipitation of strontium 90 in living bone is a physiologic and thermodynamic impossibility.

In different geographic areas, human diets contain widely varying amounts of strontium and of fluorine (fluoride ion). Although both are deposited in teeth, the strontium content of the teeth bears no relation to the fluorine content of the drinking water.

For instance, in Post, Texas, with 5.0 ppm fluorine in the water, the strontium found in the enamel of teeth is 170 ppm. But in Udsted, Greenland, with just a trace of fluorine in the water, the strontium content of tooth enamel is 280 ppm.

Rat feeding studies showed that the deposition in bone of strontium 89 was independent of the fluorine intake, although the fluorine content of the skeleton increased with dosage.

American Public Health Association, Inc., 883 Broadway, Albany 1, N.Y.

Biochemical mechanisms in inflammation

Valy Menkin. *Brit.M.J.* No. 5185:1521-1528
May 21, 1960

Inflammation is a manifestation of severe cell injury in vertebrates. Any agent that interrupts normal metabolic processes may induce an inflammatory reaction. The irritant may be exogenous or endogenous. It may be physical, chemical, or viable, as in the case of a microorganism. The sequential pattern of response is stereotyped; variations are attributed either to the specific chemistry of the irritant or to the anatomic location of the lesion.

The inflammatory reaction is initiated by disturbance in local fluid exchange. The most important alteration is a local increase in capillary permeability, brought about largely by the liberation of leukotaxine by injured cells at the site of inflammation. Leukotaxine is a diffusible substance which appears to be a polypeptide. It has the property of inducing the migration of leukocytes through the endothelial wall. Another mediator present in inflammatory exudates is termed the leukocytosis-promoting factor (L.P.F.). This factor, in addition to the thermostable leukocytosis factor, provides a reasonable explanation for the mechanism of leukocytosis in inflammation.

The role of inflammation is that of a regulator of bacterial invasiveness. The pattern of injury in inflammation is ascribed to the liberation of a toxic euglobulin termed necrosin. Fever is due to two factors: (1) a thermostable component termed pyrexin, and (2) a thermolabile factor.

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Subacute bacterial endocarditis: a clinical study

H. D. Millard and C. J. Tupper. *J.Oral Surg., Anesth.& Hosp.D.Serv.* 18:224-229 May 1960

A study of the hospital records of 50 patients with a diagnosis of bacterial endocarditis, seen from 1950 through 1956, revealed that in 11 patients the predisposing procedure was the extraction of teeth. Other predisposing dental procedures were scaling (in one patient) and root canal manipulation (in one patient). All 13 patients with a predisposing dental cause also had predisposing congenital or rheumatic heart disease. Of the 50 patients, 33 had rheumatic heart disease, 14 had congenital heart disease, 2 had arteriosclerotic heart disease and 1 had a history of rheumatic fever. The most common predisposing nondental cause was upper respiratory infection (in 16 patients).

The predominant causative microorganism in the instances of subacute bacterial endocarditis studied was an alpha hemolytic streptococcus; this also was the predominant causative microorganism in those instances in which a dental procedure was the predisposing cause; also it was the predominant microorganism in those instances in which subacute bacterial endocarditis resulted in death.

Penicillin, although not completely adequate, is still acceptable for use by dentists for preventing subacute bacterial endocarditis. In at least eight of the patients apparently predisposed to subacute bacterial endocarditis by a dental procedure, the disease could have been avoided if penicillin had been used for prevention, since in eight instances the microorganism was sensitive to penicillin.

Dental procedures should be postponed on patients who have an upper respiratory infection and who are predisposed to subacute bacterial endocarditis; furthermore, these patients should be referred to their physicians for preventive treatment.

Subacute bacterial endocarditis can occur at any age in persons predisposed to it.

The mouths of a significant number of patients were considered to be in only fair or poor condition by the examining physician at the time of admission to the hospital; therefore, a careful evaluation of the oral cavity should be made by a dentist for each patient at the time of treatment of subacute bacterial endocarditis so that predisposing dental factors may be removed under cover of a proper antibiotic which has been determined by periodic blood cultures.

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Metabolic disturbances in tooth formation

Seymour J. Kreshover. *Ann.New York Acad.Sc.* 85:161-167 March 29, 1960

Since the first detailed clinical description of developmental tooth defects was offered by Hutchinson more than 100 years ago, the most gratifying single advance has been the shift of emphasis from academic curiosity to serious concern. Today there is a realization that deficiencies in growth and development no longer can be viewed as isolated phenomena. Abnormal tooth formation generally is a nonspecific phenomenon which can be related to a variety of local and systemic disturbances, any of which may result in enamel and dentin defects either of the hypoplastic or hypocalcified variety.

Histologic studies have made possible the tracing of the pathogenesis of enamel hypoplasia from its earliest cellular manifestation to the end result of clinically demonstrable defects.

The fact that alterations in metabolic processes, regardless of their cause, can affect tooth development adversely, may have significant implications in terms of the relationship between microscopically occurring tooth defects and caries susceptibility. The peculiar patterns of anatomic bilateral distribution of carious lesions in man favor such a hypothesis.

Another important consideration of developmental tooth defects is their utilization as a tool for the pictorial recording and timing of systemic

disturbances in man. Any observed disturbance in the highly specialized function of odontogenesis may be indicative of an unfavorable response of nondental tissues undergoing simultaneous developments. Although defects in tooth development usually are thought of as postnatal in occurrence, there is an increasing awareness of their particular pertinence in the field of congenital anomalies, where prenatally occurring dental defects may be indicative not only of a widespread fetal response to adverse maternal influences but may provide a method for evaluating the nature and mode of maternal-fetal disturbances.

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Leukoplakia nicotina palati

Dieter Herrmann. *Zahnärztl.Rundschau* 69:182-185 May 8, 1960

In patients who are heavy smokers (two packs of cigarets, ten cigars or 50 Gm. of pipe tobacco or more daily) thickening of the surface layers of the oral mucosa is observed frequently. The lesions resemble those occurring in senile or solar keratosis of the facial skin, but are of grayish color. These thickened and occasionally verrucose surface plaques are referred to aptly as the lesions of leukoplakia nicotina palati. They most commonly appear on the vermilion border of the lower lip (rarely on the upper lip), often extending to the palate and the buccal mucosa.

These lesions exhibit a definite tendency to malignant change but must be differentiated from the oral lesions of lichen planus which are white and inflamed.

Five case reports of patients (30, 50, 53, 72 and 73 year old men), treated at the Dental Clinic of the Free University of Berlin, Germany, are presented.

Treatment consisted of comparatively large doses of vitamin A, and was predominantly successful. Surgical removal of the plaques was resorted to only in one instance in which the symptoms did not respond to vitamin therapy.

For the differential diagnosis, keratosis follicularis (Darier's disease) should be taken into consideration, although this disease is characterized by papules covered with grayish scabby crusts.

Patients with leukoplakia nicotina palati must give up the smoking habit; decreasing smoking is not sufficient to improve the condition.

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Classification of clinical syndromes, a guide for dental and oral diagnosis

Gottfried Schneider. *Deut.Zahnärzte Kal.* 19:146-167, 1960

(This abstract is continued from the September 1960 issue, page 558.)

The facial skin and oral mucosa syndromes, Group IV of the author's classification, consist of the following: (1) Baader's syndrome (ectodermosis erosiva pluriorificialis), characterized by multiforme erythema, erosive lesions of the oral mucosa, stomatitis, edematous inflammations on lips and tongue, habitual mouth breathing, and high temperature; (2) Fiessinger-Rendu's syndrome, characterized by pseudomembranous stomatitis and cheilitis; (3) Fuchs' syndrome (unilateral heterochromia), characterized by grayish pseudomembranous inflammation of lips, tongue and oral mucosa, and masticatory difficulties; (4) Reiter's syndrome, characterized by nongonorrheal arthritis, conjunctivitis and urethritis, nausea, high temperature, stomatitis, pharyngitis, and disturbance of the temporomandibular function; (5) Stevens-Johnson's syndrome (ectodermosis erosiva pluriorificialis), characterized by stomatitis, cheilitis, exanthemas of the face, and high temperature, and (6) Neumann-Kumer-Glanzmann's syndrome, characterized by generalized aphthosis and aphthous stomatitis.

The salivary gland syndromes, Group V of the classification, include: (1) Behçet's syndrome, characterized by multiple aphthous lesions on the oral mucosa, recurrent hemorrhages, and inflammatory swellings of all salivary glands; (2) Heerfordt's syndrome (uveoparotid fever), characterized by sarcoidosis, chronic inflammation of the parotid gland and uvea, trigeminal paralysis, and involvement of the submaxillary glands; (3) Mikulicz's syndrome, characterized by chronic enlargement of the salivary glands, replacement of the glandular tissue by lymph cells, and xero-

stomia, and (4) Sjögren's syndrome, characterized by dryness of all mucous membranes, deficient secretion of the salivary glands, dysfunction of the parotid gland, arthritis of the temporomandibular joint, and a high susceptibility to caries.

The vitamin deficiency syndromes (Group VI) consist of the following: (1) avitaminosis A syndrome, characterized by skin pigmentation, hyperkeratosis and parakeratosis, disturbances in formation of enamel and dentin, and periodontal disease; (2) avitaminosis B syndrome, characterized by neuralgic pains in the maxillofacial region and paresthesia in the oral cavity; (3) ariboflavinosis syndrome, characterized by lesions at the angles of the mouth, lips and oral mucosa, cheilosis, oral moniliasis, and masticatory difficulties; (4) Plummer-Vinson's syndrome, characterized by dysphagia, glossitis, rhagades at the angles of the mouth, cheilosis, and atrophy of the oral mucosa; (5) Heubner-Herter's syndrome, characterized by osteoporosis, rickets, susceptibility to caries, delayed tooth eruption, and disturbance in calcification of the hard tooth substances; (6) Biermer's syndrome (avitaminosis B_{12}), characterized by burning sensation in the oral cavity, Hunter's glossitis and leukopenia; (7) Moeller-Hunter's syndrome (idiopathic pernicious anemia), characterized by atrophy of the tongue papillae, glossitis, edema and paleness of the oral mucosa; (8) Moeller-Barlow's syndrome (infantile scurvy), characterized by masticatory dysfunction, hemorrhages in the oral cavity, disturbances in tooth calcification, and retarded tooth eruption, and (9) rickets syndrome (avitaminosis D), characterized by disturbance in ossification, tendency to oral hemorrhages and osteomalacia.

The pain syndromes (Group VII), consist of (1) Barré-Liéou's syndrome, characterized by motor nerve pain in the maxillofacial region, toothache (without observable cause), and vasomotor disturbances; (2) Charlin's syndrome, characterized by extreme pain along the trigeminal nerve, the oral and nasal cavities; (3) Costen's syndrome, characterized by arthrosis of the temporomandibular joint, radiant pain originating from a displaced lower jaw, and burning sensation of the tongue; (4) Fotherhill's syndrome, characterized by unilateral facial pain and paralysis originating from the mandibular ramus, and ptyalism: (5) Gradenigo's syndrome, characterized by neuralgic pain in the region of the upper jaw, toothache without determinable cause, necrotic oral mucosa, and premature tooth loss; (6) Hunt's syndrome, characterized by herpes zoster on the palate and the tongue, peripheral facial paralysis, fulgurant pain in the maxillofacial region, and facial distortion; (7) Méniére's syndrome, characterized by deafness, tinnitus, dizziness, ptyalism, nausea, and lancinating pain in mouth and ears; (8) Sluder's syndrome, characterized by burning, terebrant pain in the upper jaw, especially the soft palate, and inflammation of the maxillary sinus, and (9) Sicard's syndrome, characterized by neuralgia of the glossopharyngeal nerve, and pain wandering from the palate to the tongue, jaw and neck region.

The paralysis syndromes (Group VIII) consist of the following: (1) Bernard-Horner's syndrome, characterized by paralysis of the sympathetic nerve, the triad: ptosis, miosis and enophthalmos, and facial hemiatrophy; (2) Melkersson-Rosenthal syndrome, characterized by paralysis of facial nerve, recurrent swellings of the soft tissues of the face, especially of the lips, cheilitis granulomatosa, and masticatory dysfunction; (3) Moebius' syndrome, characterized by paralysis of all brain nerves, defects of the facial and oral musculature, hypoplasia of the lower jaw, and speech defects, and (4) Rose's syndrome, characterized by paralysis of cranial nerves 3, 4, 6, 7, 9, 10 and 12, trismus, loss of taste sensation, and Bell's palsy.

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Complications occurring in the maxillofacial region after poliomyelitis vaccination (Salk)

Th. Baumann. *Schweiz.med.Wschr.* 90:623-627 June 4, 1960

Localized and generalized complications or side effects from the Salk anti-poliomyelitis vaccine have been reported previously by Baumann and Felder (1957), Uehlinger (1957), Ossermann (1959), Walker (1956), and by other authors.

Reports of such complications involving only or mainly the maxillofacial region, however, have as yet not appeared in dental or medical literature.

After 138,526 first and second vaccinations and 69,000 third vaccinations with the Salk vaccine had been given at the Cantonal Pediatric Clinic in Aarau, Switzerland, an increase in the incidence of facial paralysis (of both the central or supranuclear type and the peripheral or infranuclear type) and of periodontal disease (gingivitis, periodontitis and periodontosis) has been observed and could be considered as complications or side effects of the Salk vaccination. After the third vaccination, such complications were comparatively rare, probably because all patients who had exhibited neuroallergic or other reactions after the first and second vaccination had been excluded from the third vaccination.

The following case reports are presented: (1) one instance of poliomyelitis associated with acute ascending facial paralysis occurring immediately after vaccination; (2) one instance of myasthenia gravis pseudoparalytica with fulminating onset; (3) one instance of generalized postdiphtheritic facial paralysis affecting the palate and the masticatory and respiratory muscles; and (4) two instances of peripheral facial paralysis associated with periapical infection of deciduous and permanent teeth. There were several instances of periodontal disease in which, however, Salk vaccine could not be determined as the causative factor but suspected only as an aggravating factor.

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Pathogenesis of sialolithiasis

S. Rauch, A. Duckert, P. Morgenthaler and A. Köstlin. *Schweiz.med.Wschr.* 90:460-464 April 23, 1960

Salivary calculi, ranging in size from a small grain to a large peach stone and in weight from 0.1 to 182 Gm., were examined at the Morphological Institute of the University of Geneva, Switzerland. The study was undertaken to establish whether chemical analysis or roentgenographic and micrographic investigations could provide clues as to the origin of sialolithiasis.

The chemical analysis of salivary calculi revealed the presence of a specific proteidic substance and of a mineral phosphocalcic fraction which were similar to those found in human bones.

Examination of the saliva excreted by glands affected by calculus formation showed that hyposalivation and an increase in sialomucoids were always associated with the formation of salivary calculi and the infection of glands and ducts was caused by it. Disturbances of the metabolism of circulation within salivary glands and their ducts may be regarded as causative or, at least, promoting factors in the development of sialolithiasis. None of the saliva specimens investigated showed a selective increase in calcium ions or phosphorus ions. The hypothesis that crystallization provoked by hypersaturation is a causative factor in the development of sialolithiasis, therefore, could not be verified by the results of this study.

Microradiograms of thin polished calculus sections showed that the strongly mineralized nuclei contain few radiopaque centers. In an isolated instance, this observation could be linked with the fact that the total nitrogen level was almost as significant in the highly mineralized nuclei as in the second (organic) strata. In the third strata, however, which were strongly mineralized, only small amounts of nitrogen were found.

Roentgen-ray diffraction revealed that, crystallographically, all calculi tested belonged to the apatite group.

From the facts established and from an analogy with the pathogenesis of other calcareous formations, the authors propose the following hypothesis of the origin and development of sialolithiasis:

1. Specific irritations such as the presence of foreign bodies, inflammations or infections within the salivary glands or their ducts produce localized neurohormonal dysfunctions which cause calculus formation.

2. Development of sialolithiasis occurs in two phases as follows: (1) the presence of pathogenic sialomucoids forming an organic network within which calcium is deposited, and (2) release of phosphorus probably by glycogenolysis, adenosine triphosphate or alkaline phosphatase, leading to formation of apatite.

3. Mechanical, chemical or infectious factors may modify the development of sialolithiasis, depending on the site and characteristics of the salivary gland mainly involved or traumatized.

24 Rue Micheli-Du Crest, Geneva, Switzerland

Organization

Canadian Dental Association

W. G. McIntosh. *J.Ontario D.A.* 37:9-11 Jan. 1960

The Canadian Dental Association was organized in 1902. It was incorporated and adopted its present constitution in 1942. In the interests of the public, the association is obligated to promote research, educate the public in dental health, and promote the art and science of dentistry. In the interests of the dental profession, the association is pledged to maintain the honor and interests of the profession, to elevate and sustain the character and the education of the dentist, and to safeguard all the common interests of the members.

Two types of membership—corporate members and individual members—are maintained. The corporate members are the provincial corporations, such as the Royal College of Dental Surgeons of Ontario; there is one corporate membership for each of the ten provinces. The association has about 5,700 individual members, with the province of Ontario having about 2,500 members. For each individual membership in the Canadian Dental Association designated by the corporate member, the provincial organization pays a per capita fee or grant to the national organization.

The governing body of the national association is the board of governors, made up of the officers of the association plus board members who are representatives from the provincial organizations. Each provincial organization appoints or elects its representatives to sit on the board of governors. Each province is entitled to one board member plus an additional representative for every 500 registered dentists within the province. At present, the board of governors has 16 representatives from the provincial organizations.

Administrative officers of the Canadian Dental Association include the secretary, deputy-secretary, treasurer, and editor. The administrative secretary is Don W. Gullett, with office in the Canadian Dental Association's headquarters, at 234 St. George St., Toronto. The board of governors meets annually. Between annual meetings, the business of the association is conducted by an executive committee made up of the officers plus four members elected from and by the board of governors.

The board of governors appoints special committees to carry on the work of the association. Twenty-two active committees have about 100 members. The chairman of each committee reports to the annual meeting. Voting privileges are restricted to members of the board of governors, but committee chairmen are encouraged to participate in the discussions.

Each annual meeting usually takes up four full days immediately preceding the annual convention of the Canadian Dental Association. The annual convention is held jointly with the annual meeting of one of the provincial dental organizations. In 1960 the annual meeting will be held September 25 through 28, in Ottawa. All members of the Canadian Dental Association are invited to participate in the business proceedings.

The Canadian Dental Association contributes to dental research by offering financial assistance to worthy students who wish to take postgraduate work in research procedures and teaching methods. It has developed a pension assurance program which covers almost every field of personal insurance. Recently, the association has been active in developing a dental health index for Canada, to assess the service obligations of the profession. The *Journal of the Canadian Dental Association* has a circulation of about 7,000.

234 St. George Street, Toronto, Ontario, Canada

Education

Competition for high talent

M. H. Trytten. *J.A.M.A.* 173:1431-1435
July 30, 1960

Competition to recruit talented youths to the professions seems certain to become increasingly sharp. The scientific revolution which has been occurring in our world in the present century now has flowered into a movement which is dominant in the progression of events. The power of research, because of its new emphasis and enormous subsidy since World War II, has increased sharply. The motivation behind this expansion is that research is now known to be profitable, and it is closely related to national prestige, welfare and security.

The resulting implications for the competition for high talent are discernible. The national funds for performance of research and development have increased even since 1953-1954 by a factor of well over 100 per cent, and they are estimated by the National Science Foundation to reach 12 billion dollars in the fiscal year ending June 30, 1960.

Whereas national expenditures are embarked on a rising curve with a rate of change quite different from that of prewar years, the rates of change in the training of personnel have continued along historic trends with little change. In the United States, training to the doctorate level has increased steadily at a remarkable pace of about 7 per cent a year.

Some of the effects of the explosive force of the new technological and scientific knowledge are rapid changes in our standard of living, in the nature and problems of our industrial administration and ways of living, and in the nature and urgency of problems of a social, political or spiritual nature.

A factor of particular importance to the healing arts is the impending increase in the national population, because the numbers of personnel needed in the healing arts have a direct relationship to the growth of the population.

The eventual effort at recruitment, whether it be for the healing arts, the sciences, or the other activities in our society that require high competence and extended training, must begin in the lower levels of the educational system. There are some good secondary schools in the United States, but there are many where the tangible evidence of good work is not reassuring.

The competition for high talent is entering a phase where each specialized field is concerning itself more and more with positive, competitive steps to assure an adequate inflow into its ranks. This is natural and not to be discouraged. But concerted efforts to increase the total pool from which all may draw is even more necessary. The total age group of oncoming youths is inflexible. We must draw from the pool the youths who have been properly educated and trained, well-motivated to begin serious work at the college level, and who possess the basic disciplines and skills to do successful work.

We who are in the professional ranks today are the trustees of those professions and their accumulated heritage. We have the responsibility of carrying on this heritage by insuring that we shall have an adequate body of successors to carry on the work of the professions. Most of us have been content to meet this responsibility by worrying about our own immediate training problems. In the future, all the professions will need to realize that the beginning of professional training is at the time the child begins to go to school. A concerted level to improve all levels of education probably can best serve the interests of each claimant group in the quest for high talent.

Office of Scientific Personnel, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

Case reports

Essential lacunae of the lower jaw: mandibular solitary cysts

E. V. Cadenat and E. Gros. *Rev.stomat.,Paris* 61:104-108 March 1960

A 12 year old girl with malocclusion (Angle's Class II, Division 2) was examined at the Dental Clinic of the Regional Hospital in Toulouse, France.

The immediate extraction of both first bicuspids was indicated prior to initiation of orthodontic treatment. Roentgenograms (Fig. 1 and 2) revealed the presence of a mandibular cyst. Microscopic examination of material obtained from the cyst by aspiration biopsy yielded neither blood nor abnormal fluid. There was complete absense of any discernible hematologic disturbance.

The findings at operation were as follows: the cystic cavity was empty and crossed the vascular network supplying the periodontal tissues; the cystic cavity was covered by an osseous sheath and had smooth walls and healthy bone structures. There was no trace of the membrane which usually lines the internal surfaces of a cystic cavity. No granulation tissue was observed at the site of the cyst or in the adjacent region.

Specimens obtained from the walls of the cystic cavity were examined histologically. Abnormal structures were absent, however, there were traces of previous hemorrhages within the cystic cavity.

The cystic cavity appeared to be gradually filling with newly formed bone substance. Uneventful healing occurred after three months (Fig. 3). It was then possible to extract the first bicuspids to obtain sufficient space for bringing the cuspids, second bicuspids and molars into an almost normal occlusion.

The case report presented does not correspond to the "simple bone cyst" described by Thoma because there was no traumatic history. Neither does it conform symptomatically with "hemorrhagic extravasation cyst" or "latent extravasation cyst" because in this instance the cyst contained neither fluid nor blood. The hypothesis advanced by Bernier that a granuloma may digest the blood clots within a solitary bone cyst has not been substantiated.

The cyst described in this case report, however, seems to be closely related to the "mandibular solitary bone cyst," described by Rushton. However, Rushton stated that the presence of fluid and blood within the cystic sac as well as previous trauma are the specific characteristics of the mandibular solitary bone cyst.

Rotter and Lapp, in the German textbook *Die Zahn-, Mund- und Kieferheilkunde: Ein Handbuch für die zahnärztliche Praxis* (*Therapy of the Teeth, Mouth and Jaws: A Manual for the Dental Practice*), edited by Karl Häupl, Wilhelm Meyer and Karl Schuchardt (1954-1960) assumed that mandibular solitary bone cysts are produced by various factors such as multiple neurofibroma, osteitis fibrosa and neoplastic arthritis deformans (all three are manifestations of Recklinghausen's disease), infantile fibrous dysplasia or a modified (healed) form of eosinophilic granuloma. However, in the case history presented, the mandibular solitary bone cyst, or to use a better term the essential lacunae, did not resemble clinically and symptomatically any of the aforementioned conditions.

The following conclusions could be drawn:

1. Cystic sacs occurring within the lower jaw which contain neither fluids nor semisolid substances (blood clots) are not true cysts but lacunae characterized by the absence of lining membranes.

2. The origin of these lacunae is unknown, therefore, they may be described as "essential" or "idiopathic" lacunae.

The following clinically different forms of essential mandibular lacunae have been observed: (1) posttraumatic lacunae usually appearing in adult patients several years after an unequivocal trauma has occurred; (2) senile lacunae which may appear in aged persons within or adjacent to the condylar region, and (3) essential lacunae which may appear, with no history of former trauma, in infants and children and is localized

Figure 1 Mandibular solitary bone cyst

Figure 2 Periapical view of the cyst

Figure 3 Cyst area three months after initial examination

anywhere between the cuspids and the first molars.

The case history reported represents the third form.

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Heller's syndrome: report of an atypical case

J. S. Sagarra. *Zschr.Kinderpsychiat.* 26:65-69 May 1960

A four-year old girl suddenly began to lose contact with her environment, develop an apathetic, depressed and introverted attitude, and became so inactive that she would not leave her bed until her parents forced her to do so.

There were bursts of groundless laughter or crying, retardation in speech and masticatory function, loss of appetite and body weight, emotional disturbances, anxiety, repetition of senseless movements of arms and legs, and epileptoid seizures.

Clinical medical examinations, lateral roentgenograms of the skull and determination of the blood sedimentation rate gave no evidence of an abnormal development, whereas dental examinations revealed the presence of abnormal developmental growth of the jaws.

The electroencephalogram showed spontaneous discharges of an epileptoid pattern, particularly in the right temporal region.

Parenteral administration of 300 mg. of vitamin B_6 (pyridoxine) daily for 30 days produced rapid improvement. Interest in the environment and in play returned and the speech difficulties subsided. After further vitamin therapy (for four additional weeks), complete regression of the symptoms occurred. The girl can now be considered normal in every medical aspect but in her dental condition.

A second electroencephalogram and dental

(orthodontic) treatment were suggested but refused by the girl's parents.

The symptom complex observed indicated that the child had suffered from an atypical form of Heller's syndrome (pseudodementia infantilis), aggravated by a dental condition, probably malocclusion (Angle's Class II, Division 1).

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Gingival and lateral periodontal cysts: report of two cases

Norman H. Rickles and Frank G. Everett.
Parodontol.,Zürich 14:41-45 July 1960
[in English]

Most gingival and lateral periodontal cysts arise from remnants of the odontogenic epithelium in the periodontal membrane or gingiva. Certain mechanisms leading to formation of these cysts operate independently of each other. These include the traumatic implantation of surface epithelium which later undergoes cystic degeneration, the cystic development from heterotopic glandular epithelium, and the cystic development within a lateral periodontal abscess.

Most periodontal cysts are discovered by routine roentgenographic examination and present no signs or symptoms except occasional swelling. In the majority of instances, periodontal cysts are associated with teeth with vital pulps.

Roentgenographic examination usually reveals the presence of a comparatively small radiolucent area adjacent to the lateral surface of a tooth root. Occasionally, the cyst causes divergence of the roots of the two adjoining teeth. Perforation of the cortical plate may occur. After successful surgical removal of a periodontal cyst, recurrence is rare. However, such a surgical intervention sometimes requires sacrificing the adjacent tooth.

Case 1. A 49 year old white woman had a painless, bluish-gray nodule on the lingual surface of the gingiva of the lower left cuspid region. The nodule, about 3 mm. in diameter, was of soft consistency and gave the impression of a cyst or a mucocele. The lesion was excised and submitted to histologic evaluation. The roentgenogram showed no radiolucent area associated with the nodule. All teeth responded normally to the vitalometer test. Histologic findings confirmed the initial diagnosis: gingival periodontal cyst.

Case 2. A 44 year old white woman had a labial swelling between the roots of the lower right cuspid and first bicuspid. All teeth responded normally to the vitalometer test. Roentgenographic examination revealed the presence of a cystlike lesion between these roots, particularly in evidence toward the crest of the ridge, although it also involved the periodontal region on both the mesial and distal sides of the root of the cuspid. On surgical exploration, it appeared that the lesion was almost entirely within the bone, breaking through the labial cortical plate and resulting in extreme gingival swelling. The nonfistulous swelling was fluctuant and measured about 5 mm. in diameter. The histologic findings provided the diagnosis: lateral periodontal cyst, although the activity of the epithelium was reminiscent of a benign neoplasm such as a cystadenoma.

In both instances, the presence of odontogenic epithelium was observed in close association with the periodontal cysts. There was no history of trauma or infection.

It is known that similar periodontal cysts occur in the gingiva of infants, and that these cysts probably arise from the dental laminae. Whether such cysts in adult patients arise from primitive odontogenic epithelium such as the lamina, the enamel organ or the more differentiated sheath of Hertwig, is impossible to determine. Some of the periodontal cysts occurring within the alveolar bone appear to cause destruction of the cortical plate earlier than would radicular cysts of similar size. It is because of the aggressive tendency in these instances and because of the solid cores of the epithelium and the multiple cysts that it can be assumed that such lesions form a diagnostic border between cysts and neoplasms. Of the 22 cysts of these types reported in literature, 16 had occurred in the lower cuspid region. However, the reason for the preferential occurrence at this site remains obscure.

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Dentistry around the world

Dentistry in the Philippines today

F. L. Ramirez. *J.Nihon Univ.School Den.* 2:173-177 June 1960

The Filipinos' love for education is not an idle boast. With a population of 24,000,000, the Philippine Islands have ten dental schools. Japan, with a population of 90,000,000, has seven dental schools, as does India with a population of 400,000,000.

Enrollment in the ten dental schools of the Philippines reached a peak of 5,406 in 1950. In the academic year 1951-1952, a regulation became effective specifying two years of predental training, which made dental education a six-year instead of a four-year program.

Today, the Republic of the Philippines has 8,000 registered dentists, for a ratio of one dentist to every 3,000 persons. Less than half of the 8,000 registered dentists engage in clinical service.

Before a graduate of a dental school in the Philippines is allowed to practice, he must pass a licensure examination conducted by the Board of Dental Examiners, the members of which are appointed for a period of three years by the president of the Republic. Dentists who desire to take advanced study must go to the United States or Europe, because no Philippine dental school offers graduate or postgraduate courses.

In 1958, 1,694 dentists paid license fees to practice dentistry in 1,313 towns and 29 cities in 49 provinces. It is likely that many others are practicing dentistry without paying license fees. Most dentists are concentrated in Manila and other large cities. The people in the remote towns receive hardly any dental service.

Eighty-eight dentists are employed by public and private hospitals throughout the Philippines. Such hospitals have one or more dentists on the staff.

The Armed Forces have 150 dental officers, the top rank being First Lieutenant Colonel. These officers are assigned to military headquarters, hospitals, barracks and camps throughout the Philippines. They provide dental service to officers and enlisted men of the Armed Forces and to members of their families.

About 108 dentists, all holders of a D.D.S. or D.D.M. degree, serve on the faculties of the ten dental schools.

Under the late President Magsaysay, a bill was passed providing for 274 public health dentists to be associated with the Bureau of Health. These dentists are assigned to congressional districts throughout the Philippines and attend to the dental needs of people in the rural areas and other places.

The Bureau of Public Schools employs 278 public school dentists who attend to the oral health of 3,812,833 public school children. The public school dentists visit each school at least once a year to examine and treat the teeth of the children and to lecture to pupils and teachers on dental health matters.

About 200 dentists serve the private schools, and an estimated 350 dentists are employed by business establishments throughout the Philippines in compliance with a law requiring free emergency dental service to all employees and laborers of commercial, industrial and agricultural establishments.

Three dentists are members of the Congress of the Philippines.

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Dentists, dental technicians, 'tooth practitioners' and 'denturists' in Switzerland

H. Helveter. *Zahnärztl.Praxis* 11:136 June 15, 1960

Today, six different types of "professional" men practice dentistry in the various cantons (states) in Switzerland. In addition, there are also many employees of dental laboratories and numerous dental charlatans who perform routinely or occasionally some or most of the dental procedures.

Switzerland, a country with a population of about 5,000,000, has four dental schools all as-

sociated with the medical faculties of the universities (Basel, Bern, Geneva and Zurich).

These schools award to graduate students, after they have attended courses for from four to five years and have passed a final examination, the degree of Doctor of Medical Dentistry (*Dr.med. dent.*). A federal board of dental examiners reviews each young dentist thoroughly and may or may not issue a federal license which entitles him to practice dentistry in all cantons of the Swiss republic.

However, the canton Schaffhausen and the half-canton Baselland, issue so-called cantonal licenses to every applicant who can prove he has passed high school, served as an apprentice to a licensed dentist (*Zahnarzt*) for two years and attended a dental school for one year. In both cantons, dental service to an urban population is rendered by men with a dental training which, in all countries of the civilized world, would be considered inadequate. In contrast, for a craftsman (electrician, instrument maker, watchmaker, and others) to be issued a cantonal license the requirements consist of studying at an occupational school for at least four years and passing two strict examinations, the first before members of the guild and the second before the cantonal board of examiners.

Based on a cantonal dental law, passed in Zurich on April 3, 1960, dental technicians residing in Zurich on that date are entitled to practice prosthetic dentistry, that is, to construct and insert dentures and dental restorations of any kind. However, this law does not stipulate whether these licensed dental technicians are permitted to extract teeth or to perform other than prosthetic procedures. It stipulates only that licensed dental technicians are prohibited from performing anesthetic procedures and surgical procedures in their practice.

In canton Lucerne, many dental technicians, called "tooth practitioners" (*Zahnpraktoren*), have received cantonal licenses to practice dentistry without any restriction.

In the cantons Glarus, Neuenburg and St. Gallen, several dental technicians have been licensed to practice prosthetic dentistry. They are called *Zahnprothetiker*, a term similar to "denturist."

In the half-canton Appenzell, any person can practice dentistry without a license and can call himself "dentist" (*Zahnarzt*). In the other cantons this title is restricted by law to dental practitioners who have obtained an academic degree.

In all Swiss cities, dental laboratories are flourishing because large quantities of orders are received daily from dentists with federal licenses, from dentists with cantonal licenses, from licensed dental technicians, from "tooth practitioners," from "denturists," and from dental charlatans. However, some of the employees of the dental laboratories practice dentistry "on the sly." They are called "black market workers" (*Schwarzarbeiter*).

The dental profession in Switzerland is immensely handicapped by those conditions. All attempts made by the Swiss Dental Association (*Schweizerische Zahnärzte Gesellschaft*) to change the situation have been in vain. The cantonal governments seek to preserve their constitutional "state rights," permitting them to issue a license to anyone they wish to. Unfortunately, the federal public health authorities and the general public also fail to cooperate with the dental profession and its national association.

München-Gräfelfing, Germany

General

Closed-chest cardiac massage

W. B. Kouwenhoven, James R. Jude and G. Guy Knickerbocker. *J.A.M.A.* 173:1064-1067 July 9, 1960

A simple, safe, effective method of restoring heart action by external cardiac massage without thoracotomy can be used by anyone, anywhere. All that is needed are two hands. In the past ten months, the new technic has been applied to 20 patients ranging in age from 2 months to 80 years. All 20 patients were resuscitated and 14 of them are alive without central nervous system damage.

When cardiac arrest occurs, the circulation must be restored promptly; otherwise, anoxia will result in irreversible damage. Two technics may be used to meet the emergency. One is to open the chest and massage the heart directly. The other is to accomplish the same end by a new method of closed-chest cardiac massage.

To administer external cardiac massage, the patient is placed in a supine position, preferably on a rigid support. The heel of one hand is placed on the sternum just cephalad to the xiphoid. The other hand is placed on top of the first (see illustration). Firm pressure is applied downward vertically about 60 times per minute. At the end of each pressure stroke the hands are lifted slightly to permit full expansion of the chest. The operator should be so positioned that he can use his body weight in applying the pressure. Sufficient pressure should be used to move the sternum 3 or 4 cm. toward the vertebral column.

Closed-chest cardiac massage provides some ventilation of the lungs. If only one person is present, he should concentrate his attention on the massage. If two or more persons are present, one should massage the heart while the other gives mouth-to-nose artificial respiration.

In 13 of the 20 patients on whom the technic was applied at Johns Hopkins Hospital, artificial respiration was applied simultaneously with the massage. The duration of the massage varied from less than 1 minute to 65 minutes. Systolic pressures during massage ranged from 60 to 100 mm. Hg. The heart was in venticular fibrillation in 3 of the 20 patients and in each instance was defibrillated by a closed-chest A.C. defibrillator shock.

Position of hands during external cardiac massage

Closed-chest cardiac massage has proved to be effective. It has provided circulation adequate to maintain the heart and the central nervous system, and it has provided an opportunity to bring a defibrillator to the scene if necessary. Supportive drug treatment and other measures may be given. The necessity for a thoracotomy is eliminated. The chief value of the method lies in the fact that it can be used wherever the emergency arises.

Five case reports illustrate the success of the treatment.

Johns Hopkins University School of Medicine, Baltimore, Md.

Sterilization of instruments and materials with beta-propiolactone

Henry F. Allen and John T. Murphy. *J.A.M.A.* 172:1759-1763 April 16, 1960

Most substances used for sterilizing surfaces at room temperatures do not kill bacterial spores. Formaldehyde and, more recently, ethylene oxide have been used as gaseous disinfectants or sterilizers at atmospheric temperatures. Still more recently, beta-propiolactone (BPL) has been shown to have pronounced sporicidal, viricidal and fungicidal activity when it is used in aqueous solution for sterilization of tissues and in the vapor phase for sterilization of enclosed spaces.

Although beta-propiolactone is toxic to tissues and penetrates poorly, it is about 25 times more active as a vapor-phase disinfectant than formaldehyde and about 4,000 times more active than ethylene oxide. Like ethylene oxide, it is easily removed by airing. Unlike ethylene oxide, it is nonflammable in the vapor state and nonexplosive. Beta-propiolactone requires a relative humidity of 75 per cent or higher for rapid bactericidal effect. These properties of beta-propiolactone led the authors to explore means of adapting this compound to surgical use for rapid sterilization of delicate instruments and materials in situations in which a surface effect, rather than deep penetration, would suffice.

In the present experiments, beta-propiolactone was used in three ways, being (1) vaporized by heat in air at atmospheric pressure, (2) vaporized at room temperature under reduced pressure, and (3) applied as an aerosol by means of nebulizers.

Varieties of surgical instruments were contaminated with the following five test organisms: *Bacillus subtilis* var. *niger; B. subtilis* var. *globigii* (strain 9372, American type culture collection); *Clostridium sporogenes; Staphylococcus pyogenes* var. *aureus,* and *Pseudomonas aeruginosa.*

Test objects and instruments up to the size of an ophthalmic biomicroscope, all heavily contaminated with resistant dry spores or vegetative bacteria, were sterilized at 25°C. ± 2°C. within one hour by each of the methods tested.

There is practically no limit to the size of objects or spaces which can be sterilized with beta-propiolactone. Anything which can be enclosed in polyethylene film can be sterilized. Metal or plastic wastebaskets can be used as containers and closed with polyethylene film. The interior and contents of any room, chamber or building which can be made reasonably airtight can be sterilized with beta-propiolactone. Removal of beta-propiolactone at the end of the sterilizing cycle presents no problem when small chambers are used. Much of the compound is hydrolyzed in the presence of water vapor and the rest is dissipated almost instantly.

During the past 14 months, beta-propiolactone vapor has been used by staff nurses for sterilization of ophthalmoscopes, electric cords and lenses used in ophthalmic surgery at the Massachusetts Eye and Ear Infirmary. No complications have arisen from its use and no instance of postoperative infection has occurred after beta-propiolactone has been used.

Massachusetts Eye and Ear Infirmary, Boston, Mass.

Dentists' eye cue

Editorial. *Monde dent.* 11:37 May 1960

The Better Vision Institute in Montreal, Canada, which investigates the problems of vision in professional men, emphasizes that no other profession makes such heavy demands on the eyes as dentistry.

Not even the young dentist with young eyes can dispute this fact when he considers how he must focus his eyes within fixed ranges for long hours. Inevitably, such prolonged muscular effort must lead to eyestrain. When a dentist reaches this point, eyeglasses can be prescribed which will be specially suited for his needs.

For example, a dentist may need trifocals with three segments expertly and inconspicuously fused into one versatile lens—one segment powered to focus sharply at an 18 inch (middle) range, another segment with still greater power to focus at a 12 inch range for close-up examination of preci-

sion work, whereas the third segment is ground for distant vision.

In this age of specialization, many dentists find it helpful to have one pair of eyeglasses specifically constructed to protect their vision during the hours they spend in what one dentist referred to as "the daily grind of our eye-to-mouth existence."

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Distribution of dental personnel in the United States

Lon W. Morrey. *Quart.Nat.D.A.* 18:89-92 July 1960

In 1920 the United States had a population of about 106,000,000, with 56,000 dentists and a dentist-population ratio of 1:1,883. By 1950 the total population was 150,698,000 and the dentist population 75,000, which resulted in a dentist-population ratio of 1:2,009. In 1960 the ratio had further worsened, to about 1:2,100.

Three things transpired between the two World Wars which influenced the country's dental manpower unfavorably: (1) a stipulation by the American Dental Association and the American Association of Dental Schools that in order for a dental school to achieve a Class A rating it must be affiliated with a recognized university; this ruling forced many proprietary schools to close; (2) a stipulation by the same bodies that the length of instruction be increased to six years, a ruling which discouraged many students from applying for admission, and (3) the depression of the 1930's which prevented many students for financial reasons from obtaining a professional education.

Unless some way is found to reduce the incidence of dental disease or to increase the means to control it, future generations will have greater difficulty in obtaining acceptable dental service than does the present generation.

If present plans materialize, by 1975 an estimated 55 dental schools will graduate 4,100 dental students annually; this figure is some 2,000 short of the 6,180 annual dental graduates which a recent federal study committee estimated would be needed by 1975 to maintain the current dentist-population ratio.

According to Dummett (1960), in 1940 the ratio of Negro dentists to Negro population in the United States was about 1:8,745, approximately 4.7 times that for the country as a whole. In 1950 the ratio was 1:8,948, the most favorable ratio being found in the New England and Pacific regions (1:2,072 and 1:3,630, respectively), and the least favorable ratio in the South and East South Central regions (1:13,970 and 1:16,357, respectively).

If the United States is to raise its standard of dental health, the nation must depend on far more than dental personnel, operative dentistry and surgical procedures.

More attention must be given by the profession to the utilization of well-trained auxiliary personnel who will function under the direction of dentists. The dietary and hygienic habits of the people must be corrected to prevent a large share of dental disease which the public inflicts on itself. Dental research must be pursued to a successful conclusion so that simple, inexpensive, practical public health measures, such as the fluoridation of public water supplies, may be initiated to reduce the extent of dental disease.

222 East Superior Street, Chicago 11, Ill.

Prescription writing

Zahnärztl.Praxis 11:174 Aug. 1, 1960

Q.—Is there a law which requires that a dentist must write his prescription by hand? Is it permissible that prescriptions be typed on properly prepared forms (printed prescription blanks)? Can the dental assistant write such prescriptions to be signed by the dentist?

A.—Most dental treatments consist of procedures performed in the oral cavity, that is, in application of therapeutic agents directly by the dentist. The use of properly written prescriptions, however, serves as a valuable and necessary adjunct to modern dental practice. The practitioner who does not avail himself of this advantage fails to do justice to both the patient and to himself. Prescriptions can be typed and no law exists which requires that they have to be written by hand. The prescription may be typed by the dental assistant but must be signed by the dentist whose federal registry number has to be added if a narcotic agent is prescribed.

(13b) München-Gräfelfing, Germany

Public health dentistry

Fluorine dosages

H. D. Cremer. *J.dent.Belge* 40:30-42 Jan.-Feb. 1960 [in German]

Within the framework of the European Organization for Research on Fluorine and Dental Caries Prevention (ORCA), a team of scientists was formed to determine the optimal dosages of fluorine to be used for the various caries-preventive procedures.

The team consisted of the following members: A. Syrrist (Malmö, Sweden), J. Forrest (London, England), P. Adler (Debrecen, Hungary), W. Hoffmann-Axthelm (Berlin, Germany), M. Iraskowa (Prague, Czechoslovakia), J. P. Dustin (Brussels, Belgium), H. J. Wespi (Aarau, Switzerland), E. Ziegler (Winterthur, Switzerland), H. R. Held (Geneva, Switzerland), G. Santesson (Stockholm, Sweden), O. Backer Dirks (Utrecht, The Netherlands), H. Hornung, (Kassel, Germany), and W. Büttner (Giessen, Germany). The author functioned as chairman.

In this study the optimal fluorine dosages for the following caries-preventive procedures were considered: (1) fluorine (fluoride ions) added to the drinking water; (2) fluorine administered in tablets; (3) fluorine added to table salt; (4) fluorine added to milk; (5) fluorine added to certain foodstuffs; (6) fluorine for topical application, and (7) fluorine added to tooth pastes.

According to the results of investigations carried out in Australia, Belgium, Brazil, Canada, Chile, El Salvador, Germany, Great Britain, Japan, Malaya, The Netherlands, New Zealand, Norway, Panama, Sweden, Switzerland, the United States and Venezuela, an optimal dosage of fluoride added to the drinking water produced in deciduous teeth a reduction in the caries incidence varying between 50 and 60 per cent, and in permanent teeth an almost uniform reduction of 60 per cent. The effectiveness, safety and practicability of the fluoridation of drinking water have been established.

The use of sodium fluoride tablets (each tablet containing 80 mg. of sodium fluoride) for children living in communities or rural areas where fluoridation of drinking water is not feasible, appears to be providing sufficient evidence for development of caries-resistant teeth.

Fluorine added to table salt (90 mg. sodium fluoride per 1 kg. salt) has been studied on a selective basis mainly in Sweden and Switzerland. Convincing evidence of the value of fluoridated salt is lacking.

Tooth pastes containing sodium fluoride or calcium fluoride have not demonstrated conclusive evidence of the benefits claimed by the manufacturers.

The use of concentrated fluorine solutions added to certain foodstuffs lacks justification.

The use of tin fluoride for topical application appears to be promising and deserves further research.

At present it seems to be impossible to draw definite conclusions as to fluorine dosage and the claimed caries-preventive effect of procedures other than controlled fluoridation of water supplies because of the numerous difficulties encountered in controlling these procedures efficiently and the many questions raised which, as yet, have not received satisfactory answers. This however, should not discourage dental researchers from undertaking further experiments and investigations.

Institute of Nutritional Science, University of Giessen, Germany.

New approach to dental caries

L. N. Peacock. *J.dent.Belge* 51:215-219 March-April 1960 [in English]

Ninety per cent of the enamel in human teeth consists of calcium phosphate with a trace of calcium fluorine, 4.5 per cent of calcium carbonate and 1.5 per cent of magnesium phosphate. It is obvious that the double salt of calcium phosphate and calcium fluoride is the most important part of the tooth structure.

The arrangement of the atoms within tooth structures, however, is still undetermined. Accord-

ing to metallurgic laws and roentgenographic investigations, it may be assumed that the atoms in all substances follow a general rule; they may be loosely or densely packed together and the better the packing the better the structure. It can be assumed that the arrangement of the atoms in the human skeleton must follow some definite plan of perfection. In the teeth, the calcium and phosphorus atoms may be loosely or tightly bound together by correct arrangement, and the trace element fluorine holds the controlling condition of favorable atomic packing. Fluorine is the most chemically active element and so great is its affinity for other substances that it defies every attempt at isolation.

The human body must obtain its atoms from the vegetable kingdom, either directly or indirectly. The atoms must be stored with accumulated sunshine in a state of stimulation in which electrons are withdrawn from a course near the nucleus. A living organic molecule receives such a high charge of light that it pulsates internally and becomes fluorescent externally.

Fluorine is to be found especially in unrefined cereals, fish and cod-liver oil. An analysis of whole wheat revealed that it contains up to 700 ppm fluorine.

The calcium and phosphorus atoms are well supplied to children by intake of cheese and other milk products, magnesium atoms by vegetables and fruits.

Owing to the present-day refining and processing of foodstuffs it cannot be expected that there will be an adequate atomic packing of tooth structures which are so easily broken down by contact with refined sugars.

Refined sugars are the main cause of caries. The most extensive and rapidly progressing form of caries occurs in bakers and candymakers. The labial surfaces of all their upper incisors usually are decayed, and the surfaces of the other teeth are attacked at all points.

Refined white sugar, however, has become an integral part of the diet of present-day mankind. The problem is: can anything be done to counteract this danger to the teeth? Rinsing the mouth and thorough toothbrushing after each meal are practical and excellent procedures. But are they sufficient to prevent the development of caries?

In 1957, there were 628,000 tons of sweets consumed in England. The direct result was a tremendous increase in the incidence of caries.

Present-day knowledge of the relation between caries and sugar intake teaches that the main task in caries reduction lies in an intensive concentration on preschool children in their homes. Dental hygienists and public health officers should visit each home periodically and examine the children's mouths thoroughly. If anything is amiss, the child should be referred to the dentist. Proper nutrition, with a minimum of carbohydrates and sugars, and a periodic examination every three months leading to immediate dental treatment whenever indicated, as well as proper oral hygiene, are still the best available procedures to reduce the incidence of caries.

About 100 years ago, because of the coarseness of the foodstuffs generally consumed, these procedures were unnecessary, but today they are imperative as the first steps in controlling caries.

The oral health of the nation's children is mainly controlled by the mothers until the children are five years old; after that time members of the dental profession usually take over.

The author has no faith in adding inorganic fluorides to the drinking water as a caries-preventing procedure, but relies on a supply of fluorine from the complex organic molecules obtained from vegetables and fish.

276, Great Cheetham Street, Higher Broughton, Salford 7, England

Effect of naturally occurring selenium and vanadium on dental caries

Gertrude Tank and Clara A. Storvick. *J.D.Res.* 39:473-488 May-June 1960

The effect of selenium and vanadium on the incidence of dental caries in native white children 10 to 18 years old, residing in selected seleniferous and nonseleniferous areas of Wyoming, was investigated.

Water supplies in the various communities were found to contain fluorine (fluoride ion) concentrations ranging from 0.0 to 2.6 ppm. No reduction in dental caries rates of the deciduous and permanent teeth was found in children living in areas where the fluorine concentration in the water ranged from 0.1 to 0.5 ppm, but reductions

were observed in all areas with fluorine concentrations ranging from 0.6 to 2.6 ppm.

The caries rates of the permanent teeth were significantly higher in seleniferous areas than in nonseleniferous areas.

The estimated selenium intake from foods was well within the limits of safety. Although all urines analyzed contained selenium, no consistent relationship was found between the intake and excretion of selenium, between selenium intake and caries, or between selenium excretion and caries.

No consistent variation in the incidence of dental caries was found which could be attributed to sugar consumption.

Two children in seleniferous areas had enamel hypoplasia of the deciduous teeth. An unusually large percentage of children (16 to 26 per cent) had enamel hypoplasia of the permanent teeth, with the largest percentage of hypoplasia found in seleniferous areas with a high fluorine content in the water.

The incidence of dental fluorosis was negligible.

Prevalence of malocclusion was increased in seleniferous areas and decreased with high concentrations of fluorine in the water. No consistent relationship existed between malocclusion and caries incidence of the deciduous teeth. However, a positive relationship was found between malocclusion and caries incidence of the permanent teeth.

Gingivitis was found in a higher percentage of children living in the seleniferous areas than was found in those living in the nonseleniferous areas. The most severe gingivitis and the highest number of PMA units affected, were found in the seleniferous low fluorine areas. No consistent relationship was found between gingivitis and caries incidence of the deciduous teeth, but a positive relationship existed between gingivitis and caries incidence of permanent teeth.

Vanadium was found in all water samples analyzed, ranging in concentrations from 0.03 to 0.22 ppm. No vanadium concentrations above 0.09 ppm were detected in the water in nonseleniferous areas. In the deciduous teeth there appeared to be a trend toward decreasing caries activity with increasing vanadium concentrations. In the permanent teeth there was a decrease in dental caries rates with increasing vanadium concentrations, which was significant for all areas combined.

The bibliography contains 75 references.

Nutrition Research Laboratory, Oregon State College, Corvallis, Ore.

The reduction of dental caries through use of a sodium fluoride mouthwash

Walter S. Weisz. *J.A.D.A.* 60:438-456
April 1960

This study was undertaken to determine the degree of reduction in dental caries experienced by children in the author's pedodontic practice who used an 0.25 per cent solution of sodium fluoride as a mouthwash for each of two daily rinsings, as compared with the reduction of caries in a group of children not using the mouthwash.

The treated patients were 32 children on whom observations were made for a minimum of two years and up to a maximum of ten years. No particular recommendations were made to the treated patients concerning the proper toothbrushing technic, nor was any stress put on diet counseling, the minimization of sweets or the correction of any other food habits. The treated patients were not subjected to topical fluorides or exposed to community water supplies to which fluorides had been added.

Sixty patients not undergoing the mouthwash treatment on whom observations were made for a minimum of two years and up to a maximum of ten years were used as controls. Their dental specifications were the same as those of the treated patients. Good pedodontic practices were employed with this group.

The reduction in DMF surfaces experienced through the continuous use of the mouthwash ranged from 80 to 90 per cent.

[An editorial note appended to the article states in part: "This article is published as a record of a clinical investigation. Its inclusion in THE JOURNAL is not to be construed as a recommendation for its general use except under supervision and prescription of a qualified dentist or physician. Concentrated forms of sodium fluoride should be dispensed for use only under rigidly supervised conditions. . . . Dispensing the quan-

tity needed for only one month would involve placing a dangerous amount (12 to 18 Gm.) of fluoride in the home. Precautions should include much more than emphasis not to swallow the diluted solution. The container should be adequately labeled to indicate the contents, to warn of its potential danger (including a warning to store out of reach of children) and to provide information on antidotes and method of treatment in case of poisoning. The container should preferably be of a distinctive form to minimize the chance of confusion and to render the contents least accessible to small children. Certainly a responsible adult should receive explicit directions and warnings and should be required to supervise the use of concentrated fluoride preparations."]

188 Carlton House, Pittsburgh, Pa.

Chronic endemic fluorosis in Banja, Bulgaria

T. Burkov and J. Todorov. *Stomat.,Sofia* 59:42-44 April 1960

Recently the occurrence of chronic endemic fluorosis (mottled enamel) was reported in the village of Banja, district of Razlog, Bulgaria. In December 1959, the teeth of 107 men and women, born and living in Banja, were investigated.

The drinking water contains 9.0 ppm fluorine. Mottled enamel was found in 42.40 per cent of teeth examined. The upper central incisors were the most frequently (57.30 per cent) and most seriously (fluorosis of the third degree) attacked teeth.

The attack rate of dental caries was 24.11 per cent, and that of periodontal disease 36.75 per cent.

Chronic endemic fluorosis produced disturbances in the renal parenchyma characterized by erythrocyturia and an increased urea content in blood and serum.

Biochemical investigations of the blood and saliva of persons with diagnosed chronic endemic fluorosis established changes in the calcium level and the alkaline phosphatase contents of the saliva, whereas the blood appeared to be free of pathologic changes.

Examination of the deciduous teeth of the school children of Banja revealed the presence of dark lines especially on the cervical edges of the tooth surfaces, separating the enamel from the cementum of the roots. Parallel lines appeared on the occlusal surfaces. Although nearly all children had mottled enamel, tooth loss caused by dental caries was negligible.

Medical examinations of children and adults showed that there were no other pathologic changes present.

Rue 7 Novembre 1, Sofia, Bulgaria

Caries prevention by administration of Mulgatum F tablets

H. Pollak. *Deut.Zahnärztebl.* 14:363-365 June 22, 1960

By order of the Ministry of the Interior of the German state North Rhine-Westphalia, experiments with a newly developed fluorine preparation in tablet form, Mulgatum F (Nattermann), were carried out in Düsseldorf and Essen from 1957 to 1960.

Mulgatum F tablets, containing 1 mg. fluorine, were given daily to 500 kindergarten pupils (from 3 to 4 years old) and to 500 school children (from 6 to 7 years old), whereas 1,000 children of the same ages served as controls. Each child received a bitewing examination and a clinical dental caries examination at the initial visit and again after 12, 24 and 36 months. Precautions were taken in order to eliminate prejudice both in the examinations and the recordings of data.

The effectiveness of Mulgatum F tablets was evaluated for the ability to reduce the incidence of dental caries in young children. One year after the initial administration of fluorine tablets, there was 24 per cent less dental caries when evaluated by the def index in the experimental group than in the control group; after three years, the difference between both groups increased to 38 per cent. In the experimental group, the newly formed cavities were also less serious than in the control group.

Although the results were highly satisfactory, additional experimental investigations are needed to evaluate the chemical and physical reactions of the hard tooth structures in children to Mulgatum F tablets.

According to the manufacturers, each Mulgatum F tablet contains besides sodium fluoride the fol-

lowing vitamins: vitamin A, (cod liver oil), D (egg yolk) and E (wheat germ oil). The fluorine preparation, initially produced for our experiments, now is generally available.

The anticariogenic effect of Mulgatum F tablets does not appear to be related to the frequency of ingestion but seems to be associated with differences in the chemical composition of the saliva following Mulgatum F administration.

Hohe Strasse 30, Düsseldorf, Germany

Diet, its dynamics and dental disorders

V. Gerard Bastien. *J.Canad.D.A.* 26:332-340 June 1960

In dentistry as in the other medical sciences, prevention has been lagging behind remarkable achievements in the restorative and surgical fields. Only recently has fluoridation to achieve the partial control of dental caries been initiated on a large scale. Few practical steps seem to have been attempted in the prevention of periodontal disease and malocclusion. Much clinical evidence indicates that proper diet can play an important role in the further control of caries and also can have a beneficial effect on the health of the supporting tissues of the teeth and on occlusion.

A diet which necessitates active function of the masticatory muscles and bones, of the teeth, periodontal membranes and gingivae, may be termed an ergogenic diet. A diet which demands insufficient function of the masticatory apparatus, causing eventual disorders by disuse, may be termed anergonic.

In the 1930's, emphasis was placed on the beneficial effect of a "balanced diet" in controlling caries. The theory has proved inconsistent with later reports of a smaller incidence of caries among undernourished groups.

The "primitive" diet seems more conducive to better development of the masticatory apparatus than is the "civilized" diet. Whenever the modern diet of devitalized, soft, farinaceous carbohydrates, of nondetergent, anergonic food has spread among primitive races, poor oral health has replaced good oral health.

Good dentitions and well-developed jaws are reported to be prevalent among Swiss, Greek and French peasants living on a diet requiring much chewing. An ergogenic diet does not necessarily imply radical dietary changes in modern eating habits, but only a selection of foods requiring masticatory activity. This can be achieved by two measures: (1) special preparation of bread, cereal, meat and other foods to give them a high ergogenicity, and (2) introduction of exotic chewy foods, especially sugar cane.

Sugar cane carries great promise of buccal health. It is pleasant, noncariogenic and supremely detergent. It provides excellent masticatory stimulation for the gingiva and muscles. After chewing two or three feet of sugar cane, one experiences a euphoric feeling of oral health due to cleanliness and stimulation. Massage provided by toothbrushing is superficial compared to that produced by chewing sugar cane.

The author has obtained good results in treating 32 patients with gingivitis by combining scaling and sugar cane chewing.

An important step in launching a program to bring about dietary changes beneficial to oral health will be to classify the various available foods according to their masticatory demand.

124 Edward Street, Toronto, Ontario, Canada

Between-meal eating habits and dental caries experience in preschool children

Robert L. Weiss and Albert H. Trithart. *Am.J.Pub.Health* 50:1097-1104 Aug. 1960

The general direction of the continuing search for more knowledge about the carbohydrate-caries relationship is guided by two important concepts currently gaining increasing support. These concepts are:

1. The frequency of eating carbohydrates, especially foods containing sugar, is an important factor in determining cariogenic activity.

2. The consistency of a given foodstuff is a most important factor in determining its cariogenic potential.

A study was conducted at preschool health conferences in West Tennessee to determine the types of between-meal items consumed and to explore the relationship between the frequency of eating between meals and caries experience. The study group consisted of 783 children ranging in age be-

tween 62 and 78 months. The mean age was about 5¾ years.

Most items consumed between meals were items of high sugar content or of a high degree of adhesiveness. The most popular between-meal items consumed, in descending order of popularity, were gum, candy, pastries, soft drinks and ice cream. No significant differences were observed in the selection of between-meal items by boys and girls, or by rural and town children.

The average frequency of items eaten between meals was 1.75 items per day. The average number of def teeth was 5.88. These figures were applicable to the total group studied and to each of its subgroups, that is, to boys and girls, and to town and rural children.

A direct and consistent relationship between caries experience and the frequency of eating items of high sugar content or high degree of adhesiveness between meals was disclosed. As the frequency of eating such items between meals increased, a corresponding increase was noted in the number of def teeth per child. The children who reported eating no items of this nature between meals the day prior to the health conference exhibited a def rate of 3.3 teeth per child. The def scores for other rates of consumption of between-meal items were as follows: one item, 4.8 def teeth; two items, 5.7 teeth; three items, 8.5 teeth, and four items, 9.8 teeth.

Findings such as presented in this report should elicit a more desirable response from the public than generalizations such as "eliminate sweets," "reduce sugar" and "substitute fruit, popcorn and nuts."

Division of Dental Public Health, U.S. Public Health Service, Washington, D.C.

Third molars and operative dentistry

Aimo V. Rantanen. *Suomen hammaslääk.toim.* 56:164-178 June 1960

In this study of the third molar, the material consisted of 2,006 patients of the Students' Dental Health Center in Helsinki, 2,218 first year students seen in 1949, and 1,427 first year students seen in 1951.

In these 5,651 subjects, there were slightly more unerupted third molars in the maxilla than in the mandible. In the mandible, four times as many partially erupted third molars were found as in the maxilla. More fully erupted third molars free from caries were found in the maxilla than in the mandible. The ratio between carious teeth in the maxilla and mandible was the same. Many more filled third molars were found in the mandible than in the maxilla. There were correspondingly more third molars extracted from the maxilla than from the mandible.

Among young undergraduates 20 to 23 years old, caries developed in third molars in the same proportion as new teeth erupted in the mouth. Treatment of these third molars consisted almost exclusively of placing restorations or of tooth extraction. The degree of difficulty in the treatment should not influence the dentist's decision in choosing between restoring the teeth or extracting them. Third molars give the entire dental arch a necessary distal support; their preservation must be considered as important as the preservation of the other natural teeth.

Because of the susceptibility of third molars to caries, early diagnosis and restoration are recommended at the slightest sign of decay. Black's principle of extension for prevention should be followed uncompromisingly in cavity preparation.

Students' Dental Health Service, Domus Academica A, Helsinki, Finland

The combination of inferior dentition and psychiatric maladjustment in naval recruits

Chester M. Pierce. *Quart.Nat.D.A.* 18:63-66 April 1960

Of 22,172 young men examined from February 1954 to February 1955 at the Great Lakes Naval Training Center, 8.6 per cent had grossly inferior dentition which required reparative dentistry before the recruit could enter boot camp, and 4.2 per cent had both grossly inferior dentition and gross emotional maladjustment. Of those recruits with inferior dentitions, more than a third (36.9 per cent) had concurrent significant psychiatric problems.

There is not a known cause-effect relationship between inferior dentition and gross emotional maladjustment.

As a group, the men who had both inferior dentition and psychiatric maladjustment demonstrated low self-esteem, which may have contributed to self-neglect, including neglect of oral hygiene.

There is a need for dentists and psychiatrists to participate in joint research. There is some evidence that oral disease may lead to emotional illness and that emotional illness may cause oral disease. Specific dental illnesses may be caused, at least in part, by chronic emotional conflicts mediated through the autonomic nervous system.

University of Cincinnati, Cincinnati, Ohio

The effects of a closely supervised oral hygiene program upon oral cleanliness

Robert J. Adams and William R. Stanmeyer.
J.Periodont. 31:242-245 July 1960

A unique opportunity to evaluate the effectiveness of almost day by day dentist-patient relationship came when a dentist was included in the group of 109 scientific and support personnel scheduled to spend the winter in the Antarctic. Past expeditions to the Antarctic routinely had reported poor oral hygiene practice and a lack of oral cleanliness.

The experimental group consisted of 103 men with a mean age of 28.3 years. Dental examinations were made and dental instructions given by one dentist who accompanied the men and lived with them both in the United States and Antarctica for 18 months.

Prior to leaving for the Antarctic, each man was given a clinical examination at which time an estimation of his oral cleanliness was made and recorded on a scale ranging from good to fair to poor. The supervised oral hygiene program was initiated by the presentation of a new toothbrush to all personnel. Group oral hygiene instruction on the proper care of the mouth was given through lectures and films. Each man was asked to fill out a "health diary" which contained questions on the number of times a day he brushed his teeth and when during the day he did so.

On arrival at Little America in the Antarctic, and each month thereafter, each man was given a clinical examination and the cleanliness of his oral structures was reassessed. During these visits and at other times, efforts were made to improve individual oral hygiene by model demonstrations, observation of patient toothbrushing technic, and stimulation of patient's pride and interest.

Thirty-six men in a control group had an initial examination and assessment of oral cleanliness, but received neither group nor individual instructions. Members of this group were not seen monthly, and their oral hygiene was reassessed again at the termination of the experiment.

At the initial examination, 56 per cent of the experimental group had fair oral hygiene, 15 per cent had poor oral hygiene and 29 per cent had good oral hygiene. After eight months this distribution changed to: good, 79 per cent; fair, 18 per cent, and poor, 5 per cent. During the year, over 600 toothbrushes were sold to camp personnel, an average of a new toothbrush every two months per man.

The total number of toothbrushings per day rose from 192 prior to arriving in the Antarctic to 238 after eight months. The number of effective toothbrushings rose from 126 to 164.

In the control group, the percentage of men with fair oral hygiene remained virtually unchanged. The "poor" classification increased and the "good" classification decreased. Initially, the 36 men brushed a total of 73 times a day, 46 (63 per cent) of these brushings being effective. Nine months later, this group totaled 66 brushings daily of which 63.3 per cent were effective.

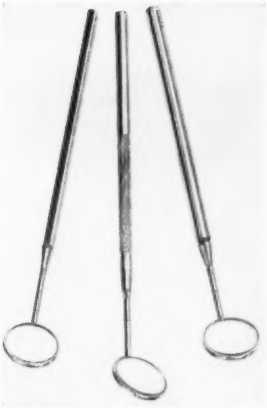
847 Monroe Avenue, Memphis 3, Tennessee

New equipment

The information reported here is obtained from manufacturers. Dental Abstracts *does not assume responsibility for the accuracy of the information. The interested reader may direct his inquiry to the manufacturer.*

Compact refrigerators in capacities of four cubic feet and six cubic feet are available in free-standing and built-in models. Installations are designed to provide reliable refrigeration service of a capacity and appearance consistent with the need of the dentist. The cabinets of "Norcold" refrigerators are made of satin finish aluminum with foamed plastic insulation. Both gas and electric models are available. Automatic controls are located behind the lower front grill. *Norcold, Inc., Los Angeles, Calif.*

L.L. (Long Life) strips and disks consist of abrasive evenly distributed on polyester film. The strength and flexibility of L.L. disks and strips are said to allow the user to follow the tooth contour accurately. Strips come in two widths—5/32 inch and 7/32 inch—and in three grits—coarse, medium and fine. L.L. disks come in three diameters—1/2 inch, 5/8 inch and 3/4 inch—and in three grits—medium, fine and extra fine. *S. S. White Dental Mfg. Co., 211 S. Twelfth St., Philadelphia 5, Pa.*



Mirror heads plated with a new "Mirror-Tone" plating process are unconditionally guaranteed against oxidization, peeling and discoloration, according to the manufacturer. All mouth examination mirrors are enameled on the back and side of the glass. Each mirror head is packed in a sealed carton. For catalog write *Mirror-Tech Manufacturing Co., 111 Cedar St., New Rochelle, N.Y.*

Claimed advantages of new Series 900 "Foredom" dental engines include a superior allcord arm; a single casting for motor, switch and arm support, and an attractive stand. The engines have a 1/10-horsepower motor, idling speed of 12,000 rpm, six-speed foot rheostat, no. 4 Doriot handpiece, and a height of 59 inches to the top of the motor. For illustrated leaflet write *Foredom Electric Co., Inc., Bethel, Conn.*

"The Coast" is one of 14 hand-printed scenic wallcoverings available for waiting rooms in dental and medical offices. The scenes are hand-printed in vinyl on paper in three, four and five panels. The paper can be washed with soap and water. *Birge Co., Inc., 390 Niagara St., Buffalo 5, N.Y.*

Doctoral and Masters' dissertations

In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

Load deflection determinations of specific wire configurations. *Gene M. Fryar. 1960. M.S.D. Indiana University.*

A comparison of maxillary arch form and dentoskeletal patterns in Japanese and Caucasian American individuals exhibiting Class II, Division 1 malocclusions. *S. Wallace Bell. 1960. M.S.D. Indiana University.*

Changes in lip position coincident with the movement of artificial teeth. *Robbie G. Robinson. 1960. M.S.D. Indiana University.*

A method for demonstrating, in vitro, the effects of various cutting instruments on tooth structure. *Zack Kasloff. 1960. M.S.D. Indiana University.*

Operative procedures and the microstructure of the marginal tissue of the pulp. *Yehia Refai Mohammed. 1960. M.S.D. Indiana University.*

Roentgenographic studies of experimentally induced bone defects in the mandible and the maxilla. *Abubakr Elsaid Ramadan. 1960. M.S.D. Indiana University.*

A study of the factors that affect the color of the teeth. *Pechara Sidhisunthorn. 1960. M.S.D. Indiana University.*

In vivo and in vitro studies of the effect of the disodium salt of ethylene-diamine tetra-acetate on human dentin and its endodontic implications. *Samuel S. Patterson. 1960. M.S.D. Indiana University.*

A comparative investigation of two mucogingival surgical methods. *Norman R. Arnold. 1960. M.S. Ohio State University.*

A comparative investigation of two mucogingival surgical methods. *Charles M. Hatchett. 1960. M.S. Ohio State University.*

The efficacy of placebo on pain perception threshold. *Allan E. Blair. 1960. M.S. Ohio State University.*

Cephalometric comparison of skeletal profile changes in the growing child. *Walter C. Buchsieb. 1960. M.S. Ohio State University.*

A comparison of healing following gingivectomy with and without prior scaling and curettage. *William P. Engelman. 1960. M.S. Ohio State University.*

Electron microscopy of the developing molar root of the rat. *Norman L. Esterl. 1960. M.S. Ohio State University.*

A study of the characteristics of stippling and its relation to gingival health. *Alan H. Greene. 1960. M.S. Ohio State University.*

The effect of retraction materials on the gingival sulcus epithelium. *James D. Harrison. 1960. M.S. Ohio State University.*

The effect of surgery on blood coagulation. *Walter C. Maslowski. 1960. M.S. Ohio State University.*

An electromyographic cephalometric study of mandibular rest position. *Kenneth K. McMahon. 1960. M.S. Ohio State University.*

Palatal length and width correlations. *Ivan E. Sanderson. 1960. M.S. Ohio State University.*

A method of measuring lip protrusion. *Luis Toro. 1960. M.S. Ohio State University.*

Streptokinase-streptodornase effects of postoperative sequelae. *John A. Zink. 1960. M.S. Ohio State University.*

Transition temperature and compressive strength of dental gypsum. *Carl W. Fairhurst. 1959. M.S. Marquette University.*

Effects of a local anesthetic on blood pressure and pulse rate. *Jay T. Estep. 1960. M.S. Marquette University.*

A longitudinal growth analysis of the human facial profile from three months to fifteen years of age. *Earl O. Bergersen, Jr. 1960. M.S.D. Northwestern University.*

Some clinical observations on marginal gingivitis. *Matthew I. Enzer. 1960. M.S. Northwestern University.*

A radiographic cephalometric analysis of internal and external lip contours and relations of the midsaggital plane in orthodontically treated malocclusions of the teeth. *Robert Herzberg. 1960. M.S.D. Northwestern University.*

Evaluation of pocket epithelium removal utilizing ultrasonic soft tissue curettage. *Harry Nadler. 1960. M.S. Northwestern University.*

The morphological, physical and biochemical characteristics of salivary corpuscles. *Gordon Henry Rovelstad. 1960. Ph.D. Northwestern University.*

The effect of orthodontic treatment on the concurrent development of the craniofacial complex. *Lennart A. T. Wieslander. 1960. M.S.D. University of Washington.*

Physiological responses of dentists to different clinical situations. *Russell E. Roder. 1959. M.S.D. University of Washington.*

Development of open bite: occurrence and curability in the deciduous and permanent dentition (Die Entstehung des offenen Bisses: sein Vorkommen im Milch- und im bleibenden Gebiss unter besonderer Berücksichtigung seiner Ausheilungstendenz). *Gerhard Müller. 1960.* DR.MED.DENT. *University of Greifswald, Germany.*

Investigations of the oligodynamic effects of several new dental materials (Untersuchungen über die oligodynamischen Wirkungen einiger neuer zahnärztlicher Materialien). *Eduard Einstmann. 1959.* DR.MED.DENT. *University of Hamburg, Germany.*

Clinical and roentgenographic examinations of the incidence of caries in 330 school children, between six and eight years old (Klinische und röntgenologische Kariesuntersuchungen an 330 Schulkindern im Alter von sechs bis acht Jahren). *Ruth Prangen. 1960.* DR.MED.DENT. *University of Kiel, Germany.*

Treatment of periodontal disease by using negative pressure: report of case (Ein Beitrag zur Behandlung der Parodontopathien mit Hilfe einer Unterdruckmasse). *Ernst Corbeck. 1959.* DR.MED.DENT. *University of Münster, Germany.*

Studies of the chronologic sex determination in the epithelial cells of the oral mucosa (Untersuchungen zur chronologischen Geschlechtsdiagnose an den Epithelzellen der Mundschleimhaut). *Ursula Hellmann. 1959.* DR.MED.DENT. *University of Münster, Germany.*

Malassez's rests in the periodontium of human teeth (Die Malassez'schen Epithelzellen-Nester im Periodontium menschlicher Zähne). *Rudolf Kessler. 1959.* DR.MED.DENT. *University of Münster, Germany.*

Investigations of the suitability of Papin's test for the determination of the Rh factor and for localization of incomplete antibodies (Untersuchungen über die Brauchbarkeit des Papintestes zur Bestimmung des Rh-Faktors und zur Feststellung von inkompletten Antikörpern). *M. Speckmann. 1959.* DR.MED.DENT. *University of Münster, Germany.*

Kinetics of the fluoridization of hydroxyapatite in regard to practical caries prevention (Über die Kinetik der Fluorierung des Hydroxylapatits in Hinblick auf die praktische Kariesprophylaxe). *Gisela Rinck. 1959.* DR.MED.DENT. *University of Tübingen, Germany.*

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